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AUTOMOTIVE INDUSTRIES

April 30, 1938
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Production

. . . April Output Gain Over March Estimated at 12,000 Cars and Trucks

Gains in the weekly output of motor vehicles noted a week ago were maintained during the week ending April 30, according to preliminary estimates based on current factory schedules, and indicating that the industry will have finished the month with production totaling approximately 250,000 units.

This represents an increase of approximately 12,000 cars and trucks over March, when 238,753 units were produced in the United States and Canada, according to official production figures just released by the U. S. Department of Commerce. Government figures also place production for the first quarter of 1938 at 678,369 units, which compares with 1,302,108 units produced in the first quarter of 1937.

This month's estimated gain over March, while noteworthy, is less than

(Turn to page 590, please)

Labor

. . . Five Detroit Plants Faced With Strike Threat From Molding and Allied Parts Council of UAW

Five Detroit manufacturers holding a blanket contract with the molding and allied parts council of the United Automobile Workers Union were confronted with a strike threat this week because of a union dispute with a sixth manufacturer also a party to the contract.

The union authorized a strike vote to be held April 29 by employes of the Peninsular Metal Products Corp., Motor Products Corp., Ainsworth Mfg. Co., Herron-Zimmer Molding Co., and the Parker Wolverine Co., which, if consummated, would affect every passenger car manufacturer in Detroit except General Motors plants, which are supplied with moldings by the Ternstedt Mfg. Co., whose contract is covered by the General Motors agreement with the union.

The dispute is between the union and the Detroit Molding Corp., also a party to the blanket contract with the molding and allied parts council, and negotiations for a settlement were under way throughout the week, although Robert Hunter, chairman of the council, said the strike vote would be held regardless of the outcome of the negotiations. Votes favoring a strike would not necessarily mean a strike, as the action also would have to be authorized by the international union, which might attempt to settle matters by arbitration.

That is what has happened in connection with the strike voted by the UAW in the Buick and Chevrolet plants in Flint. The unions announced on April 23 that Chevrolet members had voted 6500 to 2015 to strike and Buick members had voted to strike by 9500 to 2080. The plants have continued in operation, however, because the corporations agreed to meet with representatives of the union immediately and conferences have been under way.

Looking towards a settlement of the dispute, the GM-UAW agree-

(Turn to page 594, please)

PARK Q. WRAY

. . . has been appointed general manager of the replacement division of the National Motor Bearing Co., Oakland, Calif. Mr. Wray was formerly associated with E. Edelmann & Co., and with the Fredericks Armature division of the same company.

FDR-Ford

. . . Nothing "That Smacked of Commercialism" was Discussed at Luncheon Meeting, According to G. Hall Roosevelt

Henry Ford had his scheduled luncheon engagement with President Roosevelt on Wednesday but declined to divulge the nature of the conversation when he emerged from the White House after the two-hour visit. His son, Edsel Ford, and William J. Cameron, his public relations counsel, both of whom attended the luncheon, were equally non-committal. Marriner S. Eccles, Federal Reserve Board Chairman, who attended as Mr. Roosevelt's adviser, also declined comment.

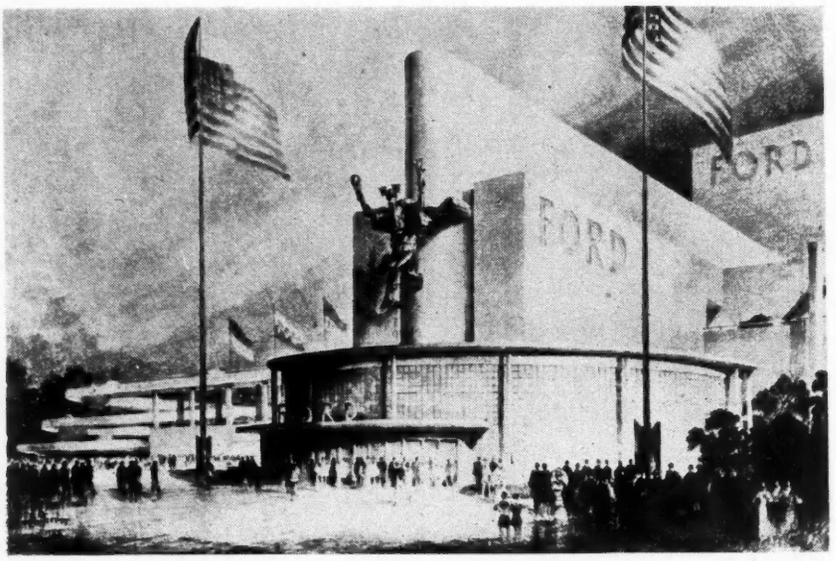
"Did you discuss a proposed recovery program with the President?" Mr. Ford was asked as he brushed aside questioners and hurried to a waiting Lincoln car furnished by the Justice Department. He kept shaking his head.

"We don't do that," he explained when asked to talk further on the

(Turn to page 595, please)

Deal-er-ium

A thousand dealer throats made the Detroit welkin ring this week with loud hosannas and whatnots in reaction to a fair trade practice code sponsored by the Federal Trade Commission and submitted at the twenty-first annual National Automobile Dealers Association convention. In this issue: A report on the meeting, page 590; notes on the suggested fair trade practice rules, same page; complete text of the FTC-sponsored rules, page 591; and some *angles* in "Multiplying the Rabbits" on page 601.



Acme photo

FORD FAIR Artist's sketch of the Ford Motor Co.'s building for the New York World's Fair. Ford's exhibit will comprise, in addition to the entrance rotunda shown above which will be devoted to institutional displays, a manufacturing concourse, patio, and the "Road of Tomorrow," an elevated concourse more than a half-mile long.

Sees Early End to Goodrich Impasse

Opinion Expressed by Dr. John R. Steelman of Labor Department After Conference; Union Workers Against Secret Ballot

Goodrich union workers at a mass meeting April 23 voted by acclamation not to take a secret ballot on the Goodrich proposal that all employes accept a substantial wage cut to avert the necessity of the company transferring 5000 jobs out of Akron.

After an all-day conference with union leaders, Dr. John R. Steelman, head of the conciliation division of the U. S. Department of Labor in Washington, indicated—according to press dispatches—that he considered an early settlement of the Goodrich impasse "quite probable."

Returning to Akron from the Washington conference, L. L. Callahan, president of the Goodrich local of the URW, declared that if the major rubber companies would agree not to cut rubber workers' wages in their branch plants, officials of the URWA would recommend to members of the Goodrich local that they accept a temporary wage reduction. The Washington conference was attended by Callahan and S. H. Dalrymple, president of the United Rubber Workers of America, with Dr. Steelman, James P. Miller, regional NLRB director; A. F. Hinrichs, chief economist of the Bureau of Labor Statistics; Isador Lubin, chief of the bureau, and P. W. Chappell, U. S. Labor conciliator.

"If we have sufficient assurances that a temporary wage reduction will benefit Akron workers, we shall recommend the agreement to Goodrich local members," said Callahan upon his return to Akron from Washington.

"On the basis of our discussion in Washington, we are prepared to resume our negotiations with the Goodrich company for a written agreement, which will also cover wages. So far, the attitude of the company has been that the matter of wages is 'take it or leave it.' It is our opinion that the matter of wages, like all other matters relating to labor relations, is a matter for negotiation.

"In discussing Goodrich wages we are faced with the problem of being fair with the company and also being fair to Goodrich workers and with the community. We cannot agree to any downward adjustment in wages without guarantees against reduction in the branch plants. We cannot succeed in reaching a sensible adjustment on that issue in Goodrich without having assurances that branch plants of other Akron companies will not also reduce wages.

"How would it benefit Akron if Goodyear is free to cut wages at Gadsden and Jackson or Firestone at Memphis, provided even that Goodrich is willing to give us assurances against wage reductions in Oaks, Pa., Cadillac, Mich., and Los Angeles, Calif.

"Obviously, if a wage reduction were granted at Goodrich without assurances of branch plants cutting, Akron would be left exactly where it is today—with only one difference—we'd all be poorer. We do not feel that the Akron companies have any right to demand of labor that it permit nation-wide wage reductions to begin here.

"To meet an emergency we will go as far as we can. But we cannot recommend any temporary reduction at Goodrich unless Goodrich, Goodyear, Firestone and U. S. Rubber guarantee us against wage reductions in their plants outside of Akron and Detroit. We repeat our earlier offer on this point. We are prepared to meet the companies separately or jointly on this issue."

March Casing Shipments Top February by 22.5%

Shipments of pneumatic casings during the month of March, 1938, estimated at 2,877,660 units, show an increase of 22.5 per cent over shipments made in February but were 50.3 per cent under shipments for March, 1937, according to statistics released by the Rubber Manufacturers Association, Inc.

The association estimates production of pneumatic casings during March at 2,759,135 units. This is an increase of 24.8 per cent above February but 53.4 per cent under March, 1937.

Pneumatic casings in the hands of manufacturers March 31, 1938, are estimated at 10,808,419 units, a decrease of less than 1 per cent under the stocks on hand February 28 and 13.2 per cent under the stocks on hand March 31, 1938.

The Pau Grand Prix

Réné Dreyfus Takes First Race Held Under New Regulations

The first international race held under the new regulations, the Pau Grand Prix run on Sunday, April 10, was won by Réné Dreyfus in a 12-cylinder Delahaye racer. The race was held over a 1¾-mile course at Pau near the Spanish border.

There was to have been both German and Italian competition. Nuvolari made some very fast practice runs in the new four-wheel-drive Alfa-Romeo, to which reference was made in a recent issue of AUTOMOTIVE INDUSTRIES, actually making a lap in 1 min. 48 sec. During one of these

practice spins, either the tank or the fuel line sprung a leak, and the car caught fire and was completely ruined. Nuvolari jumped while still going at considerable speed, but landed in a grassy spot and escaped with apparently minor injuries, including burns. The entry of the other Alfa-Romeo was then canceled. Lang's Mercedes also was withdrawn before the race.

In its later stages, after the Talbots and Bugatti had been withdrawn, the race narrowed down to a duel between Lang in a Mercedes and Dreyfus in a Delahaye. At first Carraciola in the Mercedes had held the lead. After the race was about half over, he stopped at the pits and turned the wheel over to his team mate Lang, complaining that his foot was burned. This gave Dreyfus the lead. Lang made another stop, at 66 laps, and this enabled Dreyfus to increase his lead to 3 minutes. Lang went after Dreyfus, but while he reduced the latter's lead, he did not catch up with him, and Dreyfus won the race.

On the straightaways the supercharged Mercedes of 183 cu. in. displacement was faster than the 275-cu. in. Delahayes with atmospheric induction, but the latter got away from turns more rapidly, according to reports. It appears that the new Mercedes are still suffering from "bugs," one of these being that the exhaust pipes from the two banks of cylinders are so located that they cause great discomfort to the drivers.

Used Car Week Cue for Tire Makers

Fifteen Manufacturers Will Combine to Spend $500,000 In Nationwide Campaign Starting May 14

Emulating the National Used Car Week cooperative advertising drive of car manufacturers in March, 15 tire manufacturers will combine to stage a National Tire Safety Week starting May 14 and will spend approximately $500,000 in an intensive nationwide build-up advertising campaign. Newspaper advertising will be used in 300 cities with Campbell & Ewald advertising agency of New York City, directing the campaign.

According to A. L. Viles, president of the Rubber Manufacturers Association, it is estimated that there are at least 59,000,000 tires now in use which either are smooth and unsafe or will become so this summer, and which should be replaced with new tires to produce safer motoring. He points out that this represents a potential market for $500,000,000 worth of tires over and above normal market requirements. Normal replacement tire sales for 1938 are expected to be about 30,000,000. They were 29,700,000 last year. The annual replacement unit volume has declined steadily since the peak of 49,500,000 in 1928, despite a steady increase in car registrations, and an increase in gasoline consumption.

The scheduled National Tire Safety Week apparently has been strategically timed to accomplish a dual purpose—namely of stabilizing tire prices and of capitalizing the pre-Decoration Day bulge in consumer buying of tires, accessories, etc. The tire industry's price protection under its annual spring-dating program, expires May 15. Apparently fearing price reductions on or shortly after that date because of the weakness of crude rubber prices, tire dealers generally have bought only to handle immediate requirements, while a majority have in fact liquidated their stocks and now have only skeleton stocks. A stimulation of consumer tire buying during the week of May 14-21 would naturally revive heavy dealer buying and would do much to dissipate the fear of downward price trends.

Dealer stocks in general are believed to be at least one-third lower than they were Jan. 1. This would mean that consumer buying has run consistently ahead of dealer buying. It is estimated that consumer sales in the first quarter were approximately 5,000,000 tire units, which compares favorably with normal seasonal trends. The second quarter should produce, on a normal trend basis, sales of between 9,000,000 and 10,000,000 casings.

Manufacturers completed their Safety Week plans at a special meeting at White Sulphur Springs, W. Va., last week and held special sessions to map out dealer-help programs, with advertising managers of the tire companies, in New York, April 25 and in Akron, April 27.

According to the Rubber Manufacturers Association, the manufacturers cooperating in the campaign include: Cooper Corp., Findlay, Ohio; Corduroy Tire & Rubber Co., Grand Rapids, Mich.; Dayton Rubber Mfg. Co., Dayton, Ohio; Firestone Tire & Rubber Co., Akron, Ohio; Fisk Tire Co., Inc., Chicopee Falls, Mass.; General Tire & Rubber Co., Akron, Ohio; B. F. Goodrich Co. and Goodrich Associated Lines, Akron, Ohio; Goodyear Tire & Rubber Co., Akron, Ohio; Kelly-Springfield Tire Co., Cumberland, Md.; Lee Rubber & Tire Corp., Conshohocken, Pa.; Mansfield Tire & Rubber Co., Mansfield, Ohio; McCreary Tire & Rubber Co., Indiana, Pa.; Norwalk Tire & Rubber Co., Norwalk, Conn.; Pennsylvania Rubber Co., Jeanette, Pa.; and United States Rubber Products, Inc., New York.

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*U. S. New Car Registrations and Estimated Dollar Volume by Retail Price Classes**

February new car registrations in the United States as indicated by the appended tabular data moved down 17.6 per cent from the January figure to total 117,730 units. Virtually identical percentagewise is the decrease in estimated dollar volume which, comparing the same months, amounted to approximately 17.1 per cent and—for February—amounted to $102,200,000.

	NEW REGISTRATIONS				ESTIMATED DOLLAR VOLUME			
			Two Months				Two Months	
	January	February	Units	Per Cent of Total	January	February	Dollar Volume	Per Cent of Total
Chevrolet, Ford and Plymouth	86,092	70,317	156,409	60.20	$64,600,000	$52,900,000	$117,500,000	52.04
Others under $1000	30,772	26,366	57,138	21.99	28,100,000	24,000,000	52,100,000	23.07
$1001—$1500	23,554	19,383	42,937	16.52	26,700,000	21,800,000	48,500,000	21.48
$1501—$2000	951	975	1,926	.74	1,600,000	1,700,000	3,300,000	1.46
$2001—$3000	712	486	1,198	.46	1,900,000	1,300,000	3,200,000	1.42
$3000 and over	138	102	240	.09	700,000	500,000	1,200,000	.53
Total	142,219	117,629	259,848	100.00	$123,600,000	$102,200,000	$225,800,000	100.00
Miscellaneous	105	102	207					
Total	142,324	117,730	260,054					

*All calculations are based on delivered price at factory of the five-passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes are then consolidated by price classes. Data do not include returns from Wisconsin.

Quoting Mr. Withrow

In a radio address broadcast April 20, Congressman Gardner R. Withrow commented, "Hundreds of automobile dealers have advised me that there has been a distinct change in the attitude and methods employed by their factories and factory representatives during recent months. Practices formerly common, such as shipping unordered, unwanted or other accessories, regardless of the dealer's wants, have been discontinued or modified considerably. Factory representatives are being more discreet, I am informed, in their demands on dealers to take cars and trucks, or other equipment. In other words, the high-pressure salesmanship methods which some times amounted to coercion under the threat of cancellation of the franchise or other reprisals, have been temporarily abandoned."

Production

(Continued from page 587)

the normal seasonal increase shown at this time of the year, and because all manufacturers have been continuing to gear production directly to sales is an indication that the seasonal pickup in retail deliveries has not been as great as in normal years.

Increased schedules at Chevrolet plants, spread over the past few weeks to bring the monthly output about 10,000 units higher than originally planned, played an important part in the improved showing made by the industry during the last weeks in April. Completion of the full production schedule at Buick this week, as compared with delays caused by labor difficulties a week ago, also contributed to this week's showing. Plymouth production, which also was affected by a labor dispute in another plant, returned to the pace previously established for the month.

Out of this week's estimated total output of 65,000 cars and trucks General Motors divisions were expected to contribute approximately 26,000 units, with Ford and the various divisions of the Chrysler Corp. running second with approximately 15,000 units each. Packard, Studebaker, Hudson, Willys and Nash showed little or no change over previous weeks to maintain the pace established by independent producers.—J. A. L.

1000 Dealers Hail Suggested Code

FTC-Sponsored Fair Trade Practice Rules "A Foundation On Which to Build," Says NADA President at Annual Meeting

Jubilant from an enthusiastic acceptance of a fair trade practice code sponsored by the Federal Trade Commission, more than 1000 motor vehicle dealers attending the twenty-first annual meeting of the National Automobile Dealers Association heard Stanley Horner, vice-president of the association, on April 26 affirm that the last year and a half has been "a most interesting demonstration of the political influence of the NADA." Referring to the Fair Trade Practice Code and the Withrow Resolution, Mr. Horner said: "It seems that automobile dealers have only to ask, and they can get anything they want. Our power seems to be unlimited."

At the same session Ernest M. Lied, president of the association, advanced the opinion that efforts to control automobile retailing through state and local legislation have been generally abortive in character.

He suggested that the "conference table" method of ironing out disputes between dealers and manufacturers was preferable to any kind of legislation on this subject.

Generally conciliatory in tone with respect to dealer-factory relations, Mr. Lied's address intimated, however, that "exploration" of other means of dealing with the problem would not be neglected. The fair-trade practice rules introduced through the sponsorship of the Federal Trade Commission provided, he said, "a foundation on which to build," although it was his feeling that only after the FTC investigation of the industry authorized by the Withrow-Minton resolution had been completed, could the commission have adequate knowledge on which to proceed with policing of the fair-trade rules.

Herman Wangelin, secretary of the association, offered the view that the "conference table" method of solving dealer problems had failed and that future solutions would probably have to be found through legislative and bureaucratic control.

L. M. Stewart, treasurer, reported a surplus of $63,000 at the end of the first quarter of this year, and cash assets exceeding $160,000.

Speaking at the NADA banquet Alfred P. Sloan, Jr., chairman of General Motors, iterated his faith in the conference method and warned dealers that "if a policy, even expressed in definite law, is unsound and uneconomic, even the all-powerful cannot make it work."

Outlining a merchandising policy which he believes would be fair to manufacturers, dealers, and consumers alike; affirming his faith that problems involved would yield to a reasonable approach, Mr. Sloan said:

"I am of the opinion that the maximum penetration of the market within any community can only be made possible, with stability and equity, by establishing a definite relationship between the number of dealers and the potential of the market for the product that those dealers are to sell.

". . . to make this effective requires a scientific analysis of each

Notes on the Suggested Fair Trade Rules

The text of the Fair Trade Practice Rules suggested for the automotive industry under the auspices of the Federal Trade Commission, as printed on the next and following pages is the text as it was presented to dealers and factory executives attending the National Automobile Dealers Association convention in Detroit last week. The first public hearing on the rules became, in effect, one of the sessions of the NADA convention, although this was, of course, officially disclaimed. Voting on the rules at the Detroit meeting was by yea and nay, and is not binding with respect to the final text of the rules. Under the rules of the Commission, another public hearing will be held in Washington before the final text can be promulgated. The voting on the rules at Detroit was dominated by dealer sentiment as mustered for the NADA meeting. Here is a digest of how the voting went.

Rule 3 was amended to outlaw misleading statements which might mislead other members of the industry.

Rule 5 was amended to permit the practice of returning speedometers to zero on used cars.

Rule 7 was strengthened to outlaw the bootlegging of new cars.

Rule 9 voting was divided.

Rule 13 was amended to include the removal of identifying marks on used cars as an unfair trade practice.

Rule 16 was amended to define standard equipment as that outlined in the manufacturer's catalogue.

Rule 20 was voted out, and a substitute amendment will be studied by the Commission.

Rule 21 was amended to make selling below cost unfair trade practice on new products only.

Rule 26; an addition to this rule would permit dealers to hold more than one authorized motor-vehicle selling francise.

Rule B, in Group II was voted out.

community. Out of that there should be developed a 'master' plan for each such community. The master plan should recognize all the essential facts that would lead to placing, in the community under examination, the right number of dealers, each of the right size, each in approximately the right location. And no more."

Respecting control of prices on new cars, he said: "I . . . believe that the dealers and the manufacturers in concerted action would be well advised to agree as to the prime importance of respecting and publicizing in their joint interests—and in that of the consumer, as an essential step toward stability — the official delivered price on a community basis. Its principle is sound . . . it is not price fixing. I do not believe that to be either sound or desirable."

Major part of the responsibility for determining the number of units the market can absorb lies with the manufacturer, according to Mr. Sloan, and he would, therefore, "contemplate some equitable adjustment to the dealer for liquidation of excessive stock when such circumstances arise."

Suggested Trade Practice Rules for the Automotive Industry

Group 1

Rule 1. Misrepresentation.
Knowingly making or causing to be made or published, any false, misleading, or deceptive statement, representation, guarantee, or warranty, by way of advertisement or otherwise, concerning the grade, quality, quantity use, mileage, age, size, material, content, origin, preparation, year, model, type, price, manufacture, or distribution of any industry product or merchandise, or in any other material respect, is an unfair trade practice.

Rule 2. Defamation of Competitors and Disparagement of their Products.
The defamation of competitors by falsely imputing to them dishonorable conduct, inability to perform contracts, questionable credit standing, or by other false representations, or the false disparagement of the grade, quality, or manufacture of the products of competitors or of their business methods, selling prices, values, credit terms, policies, or services, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 3. Circulating Misleading Price Quotations, Etc.
The making, publishing, or circulating by any member of the industry of false or misleading price quotations, price lists, terms, or conditions of sale, or reports as to production or sales, daily, weekly, monthly or annually with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public is an unfair trade practice.

Rule 4. Misrepresenting Used or Driven Motor Vehicles.
Selling, offering for sale, advertising or otherwise representing used or driven motor vehicles as new or undriven motor vehicles when such is not the fact, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 5. Tampering with the Speedometer.
It is an unfair trade practice for any member of the industry, or his or its agents or representatives, to fail to connect or to disconnect or to tamper with the speedometer of any vehicle acquired for use or sale, for the purpose of misrepresenting to purchasers or prospective purchasers the actual mileage or service of such vehicle.

Rule 6. Misrepresenting Character of Business.
For any person, firm, or corporation to hold himself or itself out to the public as a member of the trade, as a wholesaler, or as an authorized dealer when such is not the fact, or in any other manner to misrepresent the character, extent, or type of his or its business, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 7. Aiding and Abetting Unfair Trade Practices.
For any member of the industry knowingly to aid or abet another member, or any other person, firm, or corporation in the use of unfair trade practices, is an unfair trade practice.

Rule 8. Espionage.
Securing information from competitors concerning their business by false or misleading statements or representations or by false impersonation of one in authority and the wrongful use thereof to unduly hinder or stifle the competition of such competitors, is an unfair trade practice.

Rule 9. False Invoicing.
Withholding from or inserting in invoices, sales tickets, bills of sale, or other papers in connection with the purchase, sale, or exchange of automobiles, trucks, parts, accessories, or equipment, statements or information by reason of which omission or insertion of a false record is made, wholly or in part, of the transaction represented on the face of such invoices, sales tickets, bills of sale, or other papers, with the purpose or effect of thereby misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 10. Inducing Breach of Contract.
Wilfully inducing or attempting to induce the breach of existing contract or contracts between competitors and their agents customers or suppliers, by any false or deceptive means whatsoever, or wilfully interfering with or obstructing the performance of any such contractual duties or services by any such means, with the purpose and effect of unduly hampering, injuring, or prejudicing competitors in their businesses, is an unfair trade practice.

Rule 11. Commercial Bribery.
It is an unfair trade practice for a member of the industry, directly or indirectly, to give, or offer to give, or permit or cause to be given, money or anything of value to agents, employees, or representatives of customers or prospective customers or to agents, employees, or representatives of competitors' customers or prospective customers, without the knowledge of their employers or principals, as an inducement to influence their employers or principals to purchase or contract to purchase merchandise sold by such industry member or the maker of such gift or offer, or to influence such employers or principals to refrain from dealing in the merchandise of competitors or from dealing or contracting to deal with competitors.

Rule 12. Passing Off Altered Trade-Marked Merchandise.
The passing off, selling, or offering for sale of trade-marked merchandise, the trade marks or other distinctive features of which have been altered on the merchandise or on the containers thereof in such manner as to mislead or deceive purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 13. Imitation of Trade-Marks, Trade Names, Etc.
The imitation or simulation of the trademarks, trade names, labels, or brands of competitors, with the purpose or with the tendency and capacity or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 14. Fictitious Prices.
Offering merchandise or products of the industry for sale at prices purported to be reduced from what are in fact fictitious prices, or offering such merchandise or products for sale at a purported reduction in price when such purported reduction is in fact fictitious, with the tendency and capacity or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 15. Substitution of Products.
The substitution of any part, accessory, or product for others ordered, or the inclusion of any part, accessory, or product not ordered, without the consent of the purchaser to such substitution or inclusion and with the effect of misleading or deceiving purchasers or prospective purchasers, is an unfair trade practice.

Rule 16. Misrepresentation of Prices and Terms.
The advertising, publishing, or circulating by any member of the industry of false or misleading prices for motor vehicles represented to be completely equipped with standard equipment when such is not the fact, or the advertising or quoting of false or misleading discount rates on motor vehicles sold under installment sales plans, with the tendency, capacity or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 17. Misrepresentation of Prices and Terms as "Special."
Representing certain prices or terms as "special" when they are in fact regular prices or regular terms, with the tendency or capacity to mislead or deceive purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 18. Misleading Illustrations of Motor Vehicles.
The practice of picturing a particular model of a new car and quoting the price on a less expensive model, with the tendency, capacity, or effect of misleading or deceiving the purchasing public into the belief that the quoted price is the price applicable to the model pictured when such is not the fact, is an unfair trade practice.

Rule 19. Contingent Sales.
The practice of coercing the purchase of one or more products as a prerequisite to the purchase of one or more other products, where the effect may be to substantially lessen competition or tend to create a monopoly or to unreasonably restrain trade, is an unfair trade practice.

(Turn to page 605, please)

Automotive Metal Markets

Talk of Downward Revision in Base Prices Infiltrates Steel Market Gossip

For want of a more novel topic, possibility of a downward revision of base prices has again been injected into the steel market's gossip. Some of the Middle West parts makers, while not exactly pressing for lower prices, are reported to feel strongly that a move in this direction on the part of steel producers would prove a potent stimulant and speed up not only steel buying, but business in general. Steel producers counter by citing high production costs as an insurmountable obstacle. Mills having only 30 to 35 per cent of their capacity employed, operate at a loss at prevailing prices, and until there is more of a momentum toward better demand in evidence, steel producers argue, they would just be getting deeper into the red by lowering prices. That, however, does not eliminate the possibility of price readjustments when the time comes that these could be reasonably expected to lift operations, once they have risen to 40 to 50 per cent of capacity, into still more satisfactory ground. What irks automotive consumers of steel is the constantly recurring argument that the cost of steel is a minor factor in the cost of an automobile. The steel bill of the automotive industries runs into hundreds of millions of dollars a year and the importance of the price of steel to automotive consumers is self-evident. For the present, however, the subject of price is shelved, virtually all orders coming to finishing mills being routine in tonnage and specifications. As for steel production costs, while wage scales continue to be a heavy burden to producers, minor savings are made possible as the result of a decline in the price of scrap and a reduction in the price of refractories. Emphasizing the increase in finishing capacity is this week's going into operation of another continuous strip mill with a rated capacity of 600,000 gross tons a year in one of the plants of the largest "independent."

Official announcement by the Malayan government that it had rejected proposals for a buffer pool to stabilize the tin market, brought a mild recession in tin prices. At the opening of the week spot Straits tin was quoted at 38.20 cents, but when Singapore cables brought news of the adverse decision on the proposed buffer pool, the market declined to 37¾ cents. The buffer plan contemplated taking all tin offered at below $1,000 a ton off the market by the pool, which was to sell only when the price rose to above $1,150 a ton. Shortly before Singapore cables announced the dissent of the Malayan government, Amsterdam cabled that "the Dutch expect early establishment of a buffer pool."

Domestic demand for copper is still largely restricted to takings by the fabricating subsidiaries of the large producers. Other business is usually of the single carload type and not very plentiful at that. Foreign demand is a shade less active, but the export price is rather steady at a fraction below 10 cents, which latter level continues to be the domestic quotation. Several prominent copper company executives are on their way to Europe, presumably to participate in meetings of the international cartel, of which their companies are members by reason of their having South American production that enters European markets direct.

Labor troubles in the plants of a large aluminum fabricating concern retarded the movement of that metal, but had no effect on quotations.

Moderate carload business is reported by lead marketers. Zinc continues dull.—W. C. H.

Bethlehem Steel to Test Validity of Labor Contract as Evidence

Does a trial examiner of the National Labor Relations Board have authority to deny admission of a management-labor contract as evidence in a hearing?

The question has been submitted in the form of a petition filed with the NLRB by the Bethlehem Steel Co. It grows out of the refusal of Trial Examiner Frank Bloom to permit Bethlehem to include the SWOC-United States Steel Corp. labor contract as evidence in connection with hearings at Johnstown, Pa., centering around a SWOC complaint against the Employes' Representation plan at Bethlehem's Cambria plant.

Challenging the authority of the trial examiner to deny admission of the SWOC-United States Steel Corp. labor contract as evidence, the Bethlehem company has asked that the board set the examiner's ruling aside.

The company, on April 13, filed an application for a subpoena to be directed to David J. McDonald, SWOC secretary-treasurer, to appear at the hearing in Johnstown, Pa., and bring with him every agreement entered into since Jan. 1, 1937, by SWOC with the United States Steel Corp., or its subsidiaries. Bethlehem's purpose is to show the similarity in methods of collective bargaining under the SWOC contract and the Employes' Representation Plan, and thus to show that the company does not dominate the plan.

The petition said the company believes that a finding that it dominates, interferes with or supports the Employes' Representation Plan, must be based, if at all, upon findings of some technical defects in the procedures provided by the plan, which might indicate a measure of "support" contrary to the National Labor Relations Act, or satisfy the board that domination or interference by the company might result from the existence of some provision in or absence of some provision from the plan. The petition said the company desires to introduce evidence as to the procedures and methods employed in other cases of collective bargaining agreements in order to show what provisions they contain and what provisions they do not contain.

Pointedly the petition says the board issues subpoenas with a free hand to its counsel, without requiring even to assert—much less prove—that the evidence sought to be adduced is material or relevant, and asking no questions as a preliminary to issuance of subpoenas.

"It is plainly an unjust and arbitrary discrimination for the board in its capacity as judge to scatter subpoenas to the four winds for the benefit of itself as prosecutor," the petition said, "and yet to husband them with miserly care when they are sought by the respondent party, in relation to whom the board is attempting to perform the delicate function of prosecuting with its right hand and judging with its left. The abuses likely to follow from so discriminatory a practice are too apparent to require statement."

Australia to Construct Laboratory for Aeronautical Research

Plans are being formulated in Australia for the establishment of facilities for aeronautical research, according to a report to the Department of Commerce from the office of the American Trade Commissioner at Sydney.

The action was recommended by

the former Director of Aeronautical Research of Great Britain who visited Australia last year for the purpose of advising the Commonwealth in connection with aeronautics, the report stated.

It is planned to construct a national reference standards laboratory at Canberra which together with equipment will cost $400,000. The cost of maintenance will approximate $50,000 annually. There will also be constructed an aeronautical laboratory which will be equipped for experiments in wind tunnel engine tests and for the physical tests of aircraft instruments and other apparatus, it was stated.

When fully developed the aeronautical laboratory will be used for engineering and general research for secondary industries, according to the report.

GM Directors Re-elected

At the annual meeting of the stockholders of General Motors Corp. held in Wilmington, Del., on April 26, the directors were re-elected for the ensuing year.

Financing Off 55%

March Decrease in Dollar Volume Estimated by Dept. of Commerce

Dollar volume of retail financing of new passenger automobiles showed a decrease of 55 per cent for the month of March as compared with March, 1937, and a decrease of about 53 per cent compared with March, 1936, according to preliminary estimates by the Department of Commerce. As compared with February, 1938, there was an increase of 23 per cent.

All percentages presented below are based on daily average figures with each business day of the week weighted according to the relative volume of business as determined by experience in the trade. Comparison of March, 1938, with the same month of previous years and the percentage changes from February to March in past years are shown below:

Comparisons of March, 1938 with the same month of previous years

March, 1938 was

55.3	per	cent	lower	than	March,	1937
52.9	"	"	"	"	"	1936
28.5	"	"	"	"	"	1935
.8	"	"	"	"	"	1934
133.6	"	"	higher	"	"	1933
74.5	"	"	"	"	"	1932
16.3	"	"	lower	"	"	1931
40.1	"	"	"	"	"	1930
52.6	"	"	"	"	"	1929

February-March changes

Percentage change from February

March, 1938	+23.2
" 1937	+63.8
" 1936	+64.0
" 1935	+32.8
" 1934	+40.7
" 1933	+ 3.9
" 1932	+ 7.7
" 1931	+36.6
" 1930	+32.9
" 1929	+44.1

These estimates on automobile financing are based upon figures reported to the Bureau of the Census by a sample group of large finance companies that have been in continuous operation since 1929.

Passenger Car and Truck Production

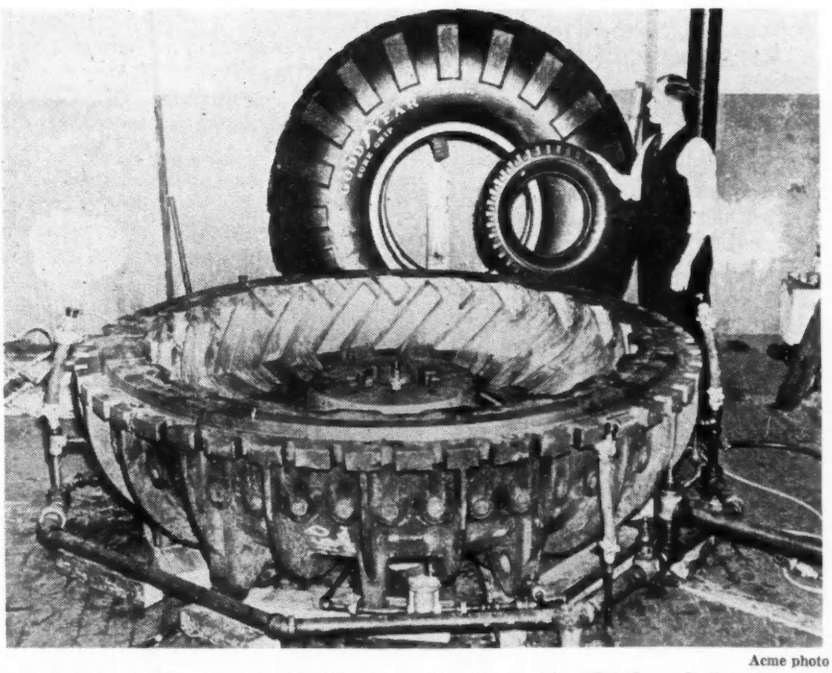
(U. S. and Canada)

March passenger car and truck production in the United States and Canada stepped up 35,881 units, an increase of 17.7 per cent over February. Comparison of the first three months of 1938 with the same period last year reveals the decrease amounting to approximately 48.5 per cent.

	March 1938	February 1938	March 1937	Three Months 1938	Three Months 1937
Passenger Cars—U. S. and Canada					
Domestic Market—U. S.	153,402	120,035	376,245	404,267	938,463
Foreign Market—U. S.	20,749	19,484	27,634	65,485	71,698
Canada	12,276	11,753	19,127	37,414	47,997
Total	186,427	151,272	423,006	507,146	1,058,158
Trucks—U. S. and Canada					
Domestic Market—U. S.	34,696	32,458	75,829	102,684	183,468
Foreign Market—U. S.	13,104	14,829	14,413	46,461	44,288
Canada	4,526	4,313	5,774	13,078	16,194
Total	52,326	51,600	96,016	162,223	243,950
Total—Domestic Market—U. S.	188,098	152,493	452,074	506,951	1,121,931
Total—Foreign Market—U.S.	33,853	34,313	42,047	111,926	115,986
Total—Canada	16,802	16,066	24,901	50,492	64,191
Total—Cars and Trucks—U. S. and Canada	238,753	202,872	519,022	669,369	1,302,108

Wisconsin Reports 5% Increase In Number of Automobiles

As of April 23, 1938, 30,701 more automobiles were being operated on streets and highways of Wisconsin than on the same date in 1937, according to Theodore Dammann, secretary of state. The 1938 issue of licenses to that date numbered 612,701, compared with 582,000 cars on the same date in 1937. The increase is approximately 5 per cent. Fees are running about 9 per cent ahead of last year, indicating that more of the larger and heavier cars are in operation.



Acme photo

HUGE heavy-duty truck tire recently built by the Goodyear Rubber & Tire Co. in Akron. Largest ever produced by Goodyear, the tire weighs 1200 lb. and stands approximately seven feet high. It is the first of a number to be built for a manufacturer of earth-moving vehicles.

Business in Brief

Written by the Guaranty Trust Co., New York

General business activity was maintained at a steady pace last week. Most lines of industry have shown no definite trend since the beginning of this year, a situation that complicates an appraisal of future prospects. It is believed that the uncertain trends in many lines are due to concern regarding developments in Washington. The business index for last week compiled by the Journal of Commerce stood at 70.0 as compared with the same figure for the preceding week and 103.1 for a year ago. Retail buying fell back to the early April levels last week after the Easter demand had subsided.

The index of business activity compiled by the Guaranty Trust Co. for March stood at 69.2 as compared with 69.1 the month before and 99.3 for the corresponding period last year. The company's index of wholesale commodity prices on April 15 was 62.4 as compared with 64.7 a month earlier and 88.6 a year earlier.

Railway freight loadings during the week ended April 16 amounted to 537,585 cars, which marks an increase of 15,607 cars above those in the preceding week, a decline of 208,938 cars below those a year ago, and a fall of 104,693 cars below those two years ago.

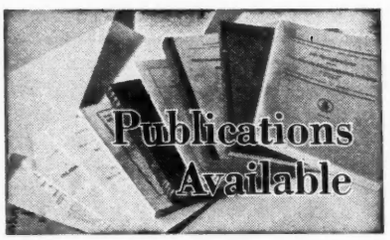
Production of electricity by the electric light and power industry in the United States during the week ended April 16 was 9.9 per cent below that in the corresponding period last year.

Construction contracts awarded in March in 37 eastern states, according to the F. W. Dodge Corp., were 91 per cent above those in the preceding month, which marks a gain of greater proportions than seasonal. All major classes of construction participated in the rise with the upturn in residential construction amounting to 98 per cent.

The weakness in the demand for agricultural products continued during March. According to the Bureau of Agricultural Economics, there was also evidence of further declines in business activity in many of the nations that purchase our agricultural commodities.

Professor Fisher's index of wholesale commodity prices for the week ended April 23 stood at 81.0, as compared with 81.1 the week before and 80.9 two weeks before.

The consolidated statement of the Federal Reserve banks for the week ended April 20 showed a decline of $3,000,000 in holdings of discounted bills. Bills bought in the open market and government securities remained unchanged. Money in circulation declined $19,900,000 and the monetary gold stock increased $16,000,000.



Taber Instrument Co., North Tonawanda, N. Y., has brought out a pamphlet describing its new model V-5 **stiffness gage** intended for accurate measurement of the stiffness and resilient qualities of paper, coated fabrics, light metallic sheet, and wire.*

Complete details on **"Nitrigages"** are contained in a bulletin recently published by the Sheffield Gage Corp., Dayton, Ohio.*

A 20-page booklet on **socket instruments** has been issued by Westinghouse Electric & Mfg. Co.*

"Developing Fair Advertising Standards," a manual of procedure for trade associations and local commercial organizations, has been published by the Domestic Distribution Department, Chamber of Commerce of the United States, Washington, D. C.*

A very attractive brochure, describing the manufacturing facilities and products of the E. W. Bliss Co., Brooklyn, N. Y., has been prepared by that company.

C. J. Tagliabue Mfg. Co.'s latest piece of literature, bulletin No. 1173, describes the company's new Celectray **indicating controller** for obtaining throttling control of electric furnaces and ovens.*

A new edition of the booklet, **"The Versatile Service of Bakelite Plastics,"** has just been published by Bakelite Corp., New York.*

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

Cameron Praises Canada's Stand on Relations With Industry

Canada has demonstrated that it has a sounder attitude to its industrial leaders than the United States, W. J. Cameron, of the Ford Motor Co., said at the closing luncheon of the Industrial Accident Prevention Association convention held recently in Windsor, Ont. Noting that Canada was the second greatest nation in the British Commonwealth and a close neighbor of the United States, Mr. Cameron contended that she should become as great an industrial country as the United States. He deprecated any claims that social legislation affecting industry had ever come from outside compulsion directed against industry. "In our country industry is not so much respected as in your country," he said. "It has been mercilessly bludgeoned and there has been a scurrilous campaign of abuse against it. Industrialists are referred to in terms of injustice and oppression of the poor. There is different treatment accorded your business leaders. In our country they give them names; in your country they give them titles." After speaking on industrial safety, Mr. Cameron said it was not so much that kind of safety he was concerned with. He believed it was always necessary to protect people from the mental dangers that surround them. "We haven't the safeguards around thought that we have around machines and so we are in danger of industrial, moral and political crippling from the fallacies that surround us today."

Labor

(Continued from page 587)

ment provides that strikes shall not be called until every effort to adjust through regular grievance procedure has been exhausted. The strike vote was taken, according to the union, in protest against alleged misinterpretation of recent supplemental provisions to the working agreement in the alleged unfair use of "preferred lists" by plant managers, and in alleged violation of seniority provisions.

Outstanding development of the week in the labor situation was the announcement by the Ford Brotherhood of America that it had proposed to the Ford Motor Co. a contract calling for an annual minimum wage of $1500 with the union and in return for this guarantee, pledging its members to buy a new car from the company every two years at dealers' prices.

Wm. S. McDowell, Sr., counsel for the Ford Brotherhood, announced the plan and said it had been submitted to the company in writing. No comment was available from company officials although they have previously denied UAW charges that the brotherhood is a company union. The Ford Brotherhood of America claims a membership of 21,400 out of the approximately 80,000 normally employed at the Rouge plant.

"The plan is based on a 250-day year," according to McDowell, "with the minimum wage fixed at $1500 and many employes would be receiving more than that. They might earn as much as $1700 or $1900 but would be required to work at least 250 days in a year. It would be up to the company to keep them busy."

The men would buy their new cars within six months of the signing of the proposed contract and would seek permission to pay one-third down and have not more than one-third of their pay deducted as payment towards the cars on the installment basis on any pay day until the cars were paid for.

UAW leaders immediately denounced the plan as a decoy to mislead workers and to discourage their joining the UAW.

WILLIAM P. ANDREWS, on May 1 will take up new duties as manager of sales in the Cincinnati district for the Carnegie-Illinois Steel Corp. Mr. Andrews, now assistant manager of sales, Chicago district, assumes the position made vacant recently by the death of Lawrence K. Slaback.

WILLIAM RIEGG has been appointed superintendent of the Nash-Lafayette works of the Nash-Kelvinator Corp. at Racine, Wis., to fill the vacancy caused by the resignation of Walter G. Helber. Mr. Riegg is a native of Switzerland, where he received his technical training, and came to America in 1905. He joined the Thomas B. Jeffery Co. at Kenosha, Wis., in 1909 as foreman in

the engine assembly department, and continued in this capacity when Charles W. Nash took over the pioneer Jeffery automobile factory in 1916. Mr. Helber was with General Motors Corp. during the World War, in charge of Liberty motor production. He went to Racine in 1924 from Flint, Mich., to assist in developing the local division of Nash, first building the Ajax and later the light Nash and Lafayette lines in the factory of the former Mitchell Motor Co.

FRANK A. SHARPE is now associated with the Bondall Co., St. Louis, Mo., as director of sales. Mr. Sharpe was formerly with the Thermoid Co.

E. B. MURRAY has been named district manager for the American Bantam Car Co., Butler, Pa., in the States of Ohio and Michigan.

CORTLANDT W. HANDY, president of Handy & Harman since 1927, has been named chairman and will take up the duties of that office May 1. **G. H. NIEMEYER** assumes the office of president. Other personnel changes include: **R. H. LEACH,** named vice-president in charge of production and research; Messrs. **H. W. BOYNTON** and **H. W. SPAULDING,** treasurer and secretary respectively; and **J. C. TRAVIS,** who in the newly created office of assistant to the president will have charge of sales.

DR. H. E. FRITZ, of the B. F. Goodrich Co., has been placed in charge of a new division to handle the sale of rubber-like materials and synthetics.

C. B. STIFFLER has been promoted from the position of vice-president and assistant general manager of United Motors Service, Inc., to the position of general manager. Mr. Stiffler succeeds **F. A. OBERHEU** who is taking a six months' leave of absence.

FDR-Ford

(Continued from page 587)

Presidential conference. But beyond that, he declined to go except to nod an affirmative when asked if the conversation was pleasant. "Sure," was his reply.

There was as much confusion concerning the subject of conversation at the Roosevelt-Ford meeting as there has been regarding the date Mr. Ford received the invitation. Reports had it that the automobile manufacturer was coming to the White House even before he announced receipt of a Presidential invitation although Mr. Roosevelt insisted that he knew nothing about the rumors. The President said on Tuesday, however, that "economics" would be discussed at the meeting, which marked the first time Mr. Ford had called at the White House since the New Deal.

If "economics" was a factor up for discussion, G. Hall Roosevelt, the President's brother-in-law, knew nothing about it. He was reported to have approached Mr. Ford several weeks ago and suggested the conference, but said after the luncheon on Wednesday that nothing was touched on "that smacked of commercialism."

"It was just a family conversation," he added. Pressed for further comment, he suggested that the 75 newspapermen talk to Cameron.

From Press Secretary Steve Early came the announcement that no further information regarding the meeting would be forthcoming from the Executive Offices.

Passenger Car Production by Wholesale Price Classes
(U. S. and Canada)
Three Months 1938 and 1937 Compared

	Three Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
Under $750	447,200	1,013,777	−55.9	88.18	95.81
$751-$1000	51,063	32,100	+59.0	10.07	3.03
$1001-$1500	7,026	7,852	−10.5	1.39	.74
$1501-$2000	1,127	3,382	−66.7	.22	.32
$2001-$3000	582	973	−40.2	.11	.09
$3001 and over	148	74	+100.0	.03	.01
Total	507,146	1,058,158	−52.0	100.00	100.00

Truck Production by Capacities
(U. S. and Canada)
Three Months 1938 and 1937 Compared

	Three Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
1½ Tons and less	152,175	229,981	−33.8	93.80	94.27
2 to 3 Tons	5,201	8,626	−39.6	3.21	3.54
3½ Tons and over	2,320	2,859	−18.7	1.43	1.17
Special and buses	2,527	2,484	+ 1.8	1.56	1.02
Total	162,223	243,950	−33.3	100.00	100.00

Graham-Paige Reduces Prices Of All Passenger Car Models

Price reductions on all of its passenger car models ranging from $40 to $92 have been announced by the Graham-Paige Motors Corp. According to the announcement, reductions were a deliberate attempt to stimulate business on the part of the company and its dealers.

The standard sedan was reduced from $1,065 to $1,025, the Graham Special from $1,155 to $1,075, the Supercharger from $1,290 to $1,198, and the Custom Supercharger from $1,380 to $1,320. The new prices include delivery in Detroit and the Federal tax.

Committee Recommends Changes In Motor Carrier Act

A committee report on the Motor Carrier Act recently published in pamphlet form by the Chamber of Commerce of the United States submits the following recommendations: "The Motor Carrier Act should be amended to make it more flexible and more promptly responsive to the special needs and characteristics of motor transport, with care that necessary enforcement measures afford adequate notice to parties concerned and do not impose undue hardship for unwilful or technical violations."

Further, the committee concludes that "The Interstate Commerce Commission should seek all ways of simplifying and expediting procedure under the law. It is imperative, especially until the accumulation of applications and initial tariff schedules is disposed of, that the Commission be given sufficient funds to administer and enforce the act."

40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

"Hub" Vehicle Bearings

"A motor vehicle without antifriction bearings is as incomplete as a rudderless boat. In ordinary vehicles they are of sufficient importance, but in motor vehicles they are absolutely necessary. Hence it is not surprising that in the past few years quite an industry should have sprung up in the manufacture of these improved devices for reducing friction in vehicle axles.

"Foremost among the concerns engaged in this business is the Ball Bearing Company, of Watson St., Boston, Mass.

From *The Horseless Age, May,* 1898.

TOOLS OF TOMORROW

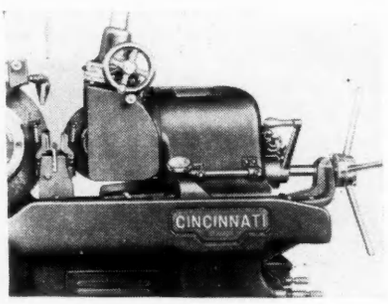
Indicator Attachment

. . . Shows amount of slide adjustment for size control on centerless grinding machines.

A new attachment for Cincinnati Nos. 2 and 3 centerless grinding machines has been designed to provide a visible and accurate indication of the amount of adjustment of the wheel slide required to compensate for wheel wear and maintain the work diameter within specified tolerance. It consists of a bracket which is bolted to the upper slide, a steel rod carrying a contact dog, a supporting bracket attached to the machine bed, and a 1/10,000 dial indicator gage having a 3-in. face.

Protection of the indicator gage is provided by a stop which limits the movement of the slide after gage contact to a distance of 0.2 in. When this limit is reached through the sizing adjustments occasionally required, the operator may return the gage reading to another starting figure.

The attachment is a product of Cincinnati Grinders, Inc.



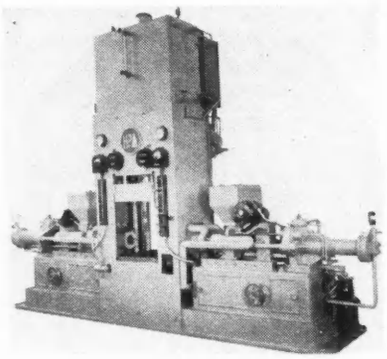
Slide adjustment indicator for Cincinnati centerless grinding machines

Injection Molding Press

. . . H-P-M unit has clamp pressure of 100 tons

The Hydraulic Press Co., Mount Gilead, Ohio, recently introduced a hydro-power injection molding press with a clamp pressure of 100 tons, a maximum projected mold cavity 30 to 60 sq. in., a plasticizing capacity of approximately 80 to 100 lb. per hr., and operating at two complete cycles per minute.

In design, the new press—designated as the Model 100—consists of a vertical, downward acting mold clamp mounted on a substantial base



Hydraulic Press Co.'s new injection molding press

together with two injection units, one on either side. Capacity of each unit is 8 oz., or a total of 16 oz. for the two units. These units are arranged to move toward the mold when it is clamped so that the injection nozzles engage sockets on the parting line of the mold.

The clamp portion of the Model 100 is virtually the same as that on the H-P-M- Fastraverse Presses ordinarily used for molding thermosetting materials such as Bakelite. It may, therefore, be used for this class of molding without change.

Broaching Machine

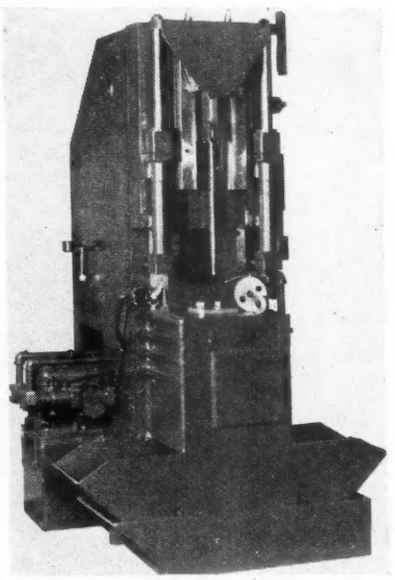
. . . Six ton vertical unit used for broaching holes in crankshaft and camshaft timing gears.

According to a report from the Oilgear Co., Milwaukee, Wis., one of its 6-ton vertical pull-down broaching machines is being used to broach holes in crankshaft and camshaft timing gears to size within a tolerance of plus or minus 0.0005 in. at the rate of 270 timing gears per hr.

Several features of this machine are: convenient stationary loading level, hydraulically operated tool handling slide, automatic lower broach puller, tool support on both ends for first portion of stroke, positive and continuous lubrication of tool and work, automatic lubrication of hardened steel ways, simple push button production control with emergency stop, separate push button set-up control and Oilgear controlled, fluid power operation.

The manufacturer of the machine points out that these features eliminate handling of the broach, threading of the work over the broach shank and cautious centralizing of the work by hand.

The machine is so designed that the main slide can be used as an alternative for surface broaching operations. Tools can be affixed to the main slide and the necessary fixture on the stationary platen. Essential specifications include: normal capacity, 12,000 lb.; peak capacity, 18,000 lb.; stroke, adjustable, max., 24 in.; cutting speed, variable, ft. per min., 4 to 35; return speed, variable, max., ft. per min., 60.



Six-ton Oilgear vertical pull-down broaching machine

Books of automotive interest

THE SAGA OF THE ROARING ROAD, *by Fred J. Wagner, as told to John M. Mitchell. Published by Meador Publishing Co., Boston.*

Many of the older men in the industry will remember Fred J. Wagner, familiarly known as "Wag," who for many years was official starter of automobile races held under A.A.A. sanction. Wagner for a good part of his life was connected with trade publications, having gained his spurs as an advertising solicitor for

Bearings, a leading bicycle paper in its day. In 1900 *Bearings*, *Cycling Life* and *The Referee* were merged under the title *Cycle Age*, with Sam Miles, later manager of national automobile shows, at the helm, and *Cycle Age* in due time became *Motor Age*. While with *Bearings*, Wagner officiated as clerk of the course at bicycle meets, and in this way he became inducted into the racing game, in which he was to achieve prominence in later years.

As an advertising man for automobile publications, and a publisher, Wagner met most of the pioneers of the automobile industry and movement, and later, as a race starter, he became acquainted with most of the famous race drivers. In his book he gives accounts of his meetings with well-known pioneers and tells numerous readable yarns of the track and road. He tells of having obtained a subscription to *Cycle Age* from "H. Ford," of Detroit, which was entered on the subscription list with the remark, "Says he will pay the first of next month"; and of some years later having declined an offer of a $5,000 investment in the Ford Motor Co., which was then being organized. When Elwood Haynes had one of his first cars shipped to Chicago, Wagner was with him in the car on that historic occasion when they were ordered off Michigan Boulevard by a policeman and told to drive into an alley. He also recounts the stirring stories of how John Willys made his entry into the automobile industry and how Henry Ford fought the "Trust" in the Selden patent litigation. Most of the space is devoted to racing events, with which Wagner was intimately connected. The atmosphere of the race track naturally is one of excitement, and there is plenty of color to Wagner's story as transcribed by Mitchell.

Tracklaying Tractor Shipments Moved Ahead 21 Per Cent

Overseas' consignments of tractors and parts during March, 1938, were valued at $5,134,980, a gain over the comparable figure for last year of $4,483,721. Shipments of the tracklaying type showed the largest gain, 21 per cent, to $1,930,070 from $1,589,865, compared with a 6 per cent improvement in the wheel type of $2,320,526 from $2,188,758 in March of last year, according to the Machinery Division, Department of Commerce. As usual, more than half of the wheel type sales were in the 15 to 32 belt hp. size range, $1,364,128 against $1,287,062, and most of the remainder in the larger sizes, $875,323 in March, 1938, and $774,323 a year ago.

The fuel injection type predominated in the tracklaying tractor sales, and were valued at $1,097,483, a 7 per cent gain over the shipments totaling $1,028,770 in March, 1937. More than half of these sales were made in the 35 to 59 drawbar hp. sizes, and most of the remainder in the larger units. The greatest improvement in the tractor sales, 48 per cent, was registered in the carburetor units of the tracklaying type, which were shipped abroad to the value of $832,587 during the month under review compared with $561,087 year ago. As is generally true, most of these shipments comprised the sizes under 35 hp., $661,560 against $530,344 in 1937, but the major advance occurred in the 35 to 59 drawbar hp. size range to $133,234 from $10,296 in March, 1937, the division added. The exports of tractor parts and accessories also increased to $884,384 from $705,098.

Calendar of Coming Events

CONVENTIONS AND MEETINGS

Chamber of Commerce Meeting, Washington ..... May 2-5
American Foundrymen's Association, Foundry Show, Cleveland.... May 14-19
National Battery Manufacturers' Association, Spring Convention, Cleveland ..... May 24-25
American Iron & Steel Institute Meeting, New York ..... May 26
SAE Summer Meeting, White Sulphur Springs, W. Va. ..... June 12-17
American Society for Testing Materials Meeting, Atlantic City, N. J., June 27-July 1
National Petroleum Association Meeting, Atlantic City, N. J..... Sept. 14-16
SAE National Regional Fuel and Lubricants Meeting, Tulsa, Okla.. Oct. 6-7
SAE National Aircraft Production Meeting, Los Angeles, Calif... Oct. 13-15
American Welding Society Meeting, Detroit ..... Oct. 17-21
SAE Annual Dinner, New York.... Nov. 14
National Safety Council Meeting, Chicago ..... Nov. 14-18
American Petroleum Institute Meeting, Chicago ..... Nov. 14-18
National Industrial Traffic League Meeting, New York ..... Nov. 17-18
SAE National Production Meeting, Milwaukee, Wis. ..... Nov. 30-Dec. 1
Automotive Service Industries Show, Chicago ..... Dec. 5-10
National Standard Parts Association Meeting, Chicago ..... Dec. 9-10

SHOWS

New York, National Motor Truck Show, Nov. 9-15
New York, National Automobile Show, Nov. 11-18
Pittsburgh, Pa., Automobile Show, Nov. 11-18
Detroit, Mich., Automobile Show, Nov. 11-19
Columbus, Ohio, Automobile Show, Nov. 12-18
Buffalo, N. Y., Automobile Show. Nov. 12-19
Chicago, Ill., Automobile Show.. Nov. 12-19
Milwaukee, Wis., Automobile Show, Nov. 12-19
Minneapolis, Minn., Automobile Show, Nov. 12-19
*Philadelphia, Pa., Automobile Show, Nov. 12-19
*San Francisco, Calif., Automobile Show ..... Nov. 12-19
Los Angeles, Calif., Automobile Show, Nov. 12-20
*Elmira, N. Y., Automobile Show, Nov. 14-19
New Haven, Conn., Automobile Show, Nov. 14-19
Baltimore, Md., Automobile Show, Nov. 19-26
*Washington, D. C., Automobile Show, Nov. 19-26
*Cincinnati, Ohio, Automobile Show, Nov. 20-26
*St. Louis, Mo., Automobile Show, Nov. 20-27
Newark, N. J., Automobile Show, Nov. 26-Dec. 3
Denver, Colo., Automobile Show, Dec. 5-10

*Tentative

New Line of ¾-Ton Trucks Announced by Dodge

A new line of Dodge ¾-ton trucks was announced this week by Joseph D. Burke, director of truck sales, Dodge Division of Chrysler.

The line is available in two wheelbase lengths and body sizes. Chassis with flat cowl face, chassis and cab, express, stake and platform body types are available on a 120-in. wheelbase while the aforementioned, plus panel and canopy models are available on a 136-in. wheelbase. The new vehicles carry a maximum gross weight rating of 5200 lb.

Dimensions of the panel type are: Length on floor, 115 in.; maximum width, 58⅜ in., and maximum height, 50⅝ in.

Dimensions from back of cab to center of rear axle are 41 11/16 and 57 11/16 in. and from the cowl to center of rear axle, 80 63/64 in. and 96 63/64 in. respectively on the 120-in. and 136-in. wheelbase chassis.

Commercial Credit Reports Net Income of $2,863,458

The Commercial Credit Co. has announced a net income of $2,863,458 for the first quarter ended March 31, 1938, after interest and discount charges, reserves for doubtful items, minority interests, Federal income and other taxes, except surtax on undistributed profits. This is equivalent, after dividend requirements on 4¼ per cent convertible preferred stock, to $1.48 a share on 1,841,993 shares, including scrip, of common stock outstanding at the close of the period.

This compares with $3,312,008 or $1.72 per share on 1,841,567 shares of common stock, including scrip, in the March quarter last year.

Part One **The concluding part will appear in an early issue of AUTOMOTIVE INDUSTRIES**

Industry's No.1 Job—

By PAUL W. GARRETT*

I ASSUME that most of us here have been so reared in the faith and in the realities of a free America that even now, as a world war in ideas is disrupting established institutions everywhere, perhaps not one of us in his heart is ready to believe anything can happen to destroy the liberties that are our own heritage.

But of course it can. Already, even as we have stood by marveling with what ease world changes came to pass, one after another the free governments have fallen. And now these United States stand as one of the few countries where the people still rule, where men may aspire to a better future and where enterprise still is free.

Various reasons have been advanced for this amazing retreat from hard-won liberties, but the one important reason that need concern us is that the adherents of free government, those who support representative forms, the citizens—or, if you please, the customers of free government—have been slipping away. They have been abandoning their basic charters. They have been turning to new doctrines, not from any considered knowledge that the now doctrines offered more, but for want of an understanding of their own government—its origins, purposes, methods and its results.

Now when faith in an institution like government is lost—the purposes and principles forgotten—you must expect two results: the institution no longer renders its accustomed service, and new leaders arise.

Precisely these things have been happening, not because of any inherent or chronic weakness in the goverments concerned, but because free peoples have been too busy enjoying their benefits, too intent upon capitalizing their opportunities, ever to consider that the system which produced these benefits and opportunities might itself sometime be imperiled. Few stopped to realize that one could live under and yet not understand the why and the how of free government, could absorb its benefits and still not know the fundamental features distinguishing it from other systems. Few stopped to figure what loss in their own personal lives a change in the system might bring. Long-time familiarity with common rights and privileges so often breeds indifference—even contempt.

Coincident with this decline in the spirit of free governments—and as a direct outgrowth—it was only natural that some should question another inherently strong and dynamic force. I refer to that institution so firmly imbedded in American tradition known as private enterprise. Call it the system of individual initiative, or the capitalistic order, or the American way of work and life—call it what you will, the facts are that our whole economic and industrial structure has been thrown into confusion. It has been thrown into confusion not because of any inherent or irremediable weakness within itself, but because it has failed to make clear to people the philosophy and principles of its own existence. If the American business system is to preserve the right to continue its contributions to the general welfare, it must learn to interpret itself in deeds and in words that have meaning to others than itself. For it is not what industry can do for itself that matters. Industry's destiny rests and must necessarily rest not on the system's benefits to capital, not on its benefits to labor, but in the final analysis on its benefits to that most important group that is the common denominator of all—the consumer, the group that outnumbers and includes all others.

And are we not a little shortsighted nowadays to explore so many questions with thought for almost very class except the consumer? The employe's side we headline. The employer's side we expound. These two servants of industry we try daily before our political tribunals in heated arguments. But rarely do we present the case for sober trial in terms that have consumer meaning before the supreme court of public opinion.

We have been generally alert in building a profit motive system that has brought to the American consumer the highest standard of living in the history of mankind. We have been inexcusably stupid in our failure to give him an understanding of how it is that consumer dreams and desires become realities under our system of large scale enterprise. We have made no appreciable effort even to explain the A B C's—the simple premises and processes — of the American plan; to explain that the standard of living for all goes up, and can only go up, as the true price of goods for all is brought down.

And until this elementary concept is got across, how can we expect people to understand that their advanced standard of living—far beyond anything else in the world —is inextricably linked to the characteristic American plan of mass production in industry by which managements are forever striving to drive costs lower and lower to make more and more goods for more and more people? Were this principle understood people would have infinitely greater faith in their own security. They would see that hope ahead lies not in surrendering this basic formula but in making it work better, and making people understand it better. They would recall with understanding that the high

* Presented at the Annual Convention of the American Association of Advertising Agencies.

living standard that was enjoyed a hundred years ago by scarcely a tenth of our people is now the common possession of two-thirds. They would envision the time perhaps a half century away when, under a continued application of this same formula, poverty might become practically eliminated or reduced to a point where only a tenth of our people would be lacking a satisfying supply of the comforts of life. They would see plainly enough why industrial workers seldom migrate from, but always toward lands of opportunity—why even recently there has been no evident trek back to the countries of the dictators.

Because so many have not had this understanding, have been viewing themselves as employers, or workers, or farmers—rather than as consumers of goods—they have allowed their narrower outlook almost to blind them, and have put under scourge the source of their broader opportunities. Without realizing it, they have put business on the spot.

Thrust by this turn of events into an awkward and unaccustomed place,

Paul W. Garrett, Director of Public Relations, General Motors Corp.

Public Relations

conscious of past omissions and critical future needs, industry has been fervently taking stock of itself and submitting to frank, and frequently brutal, self-examination. It has conducted a searching inquiry into the validity of its established principles and accepted doctrines. Out of that inquiry has come a great new interest in what we refer to as human, or public, relations as applied to business. For industry, like democracy, depends for its present success and its future existence upon people, upon those who partake of its responsibilities and its benefits—upon men and women—upon customers.

One reason that business has not needed in the past to explain the customer advantages of the system, or that free government has not needed similarly to explain itself, is that in earlier days these advantages were extolled in the literature of the time. The benefits were new and vivid. For most of the 150 years of our existence as a nation our songs and poetry, our school books, our popular literature were written in a vein reminding people that they lived in the best of all lands. Ambition was generally taught as an admirable trait. The philosophy even took such expression in the Horatio Alger books —naive, judged by today's standards —as parables on the advantages of working hard and getting ahead. Successful men were objects of popular regard. To call a man a captain of industry was to praise him.

So it is only in recent years that we have begun to talk about public relations. I wonder how many of us realize, when we use those words, exactly what they mean. I recall a quotation from Justice Holmes in one of his decisions when he said: "A word is not a crystal, transparent and unchanging; it is the skin of a living thought and may vary greatly in color and content according to the circumstances and time in which it is used."

Now when we put together two words which have not been together in the past—I mean the words *public relations*—we have joined two words that are not joined in Webster's Dictionary, although there you will find public house, public service, public school and public spirit.

Public relations is a synthetic term carrying many meanings. By some it is used as a fancy name for common press agentry; by some as insidious propoganda to put something over. By others, it is used to mean something else, usually the telling of

the "favorable" side of business. It is, of course, none of these things. It is infinitely more. Put the two words together in a different way and you have "relations with the public."

Now if we are going to talk about the public, we must regard the term as something more than a label. It refers to people—people comprising many over-lapping groups. The folks who build our products. Those who distribute them. Those who buy them. Those who own the business. Those who live in the plant community. Those who supply materials.

Most persons fall within this or that special group. But the important thing is that they are all customers—members of that largest of all groups—the consuming public.

Public relations, therefore, is not something that can be applied to a particular phase of a business—nor is it an umbrella covering everything but touching nothing. It is rather a fundamental attitude of mind—a philosophy of management—which deliberately and with enlightened selfishness places the broad interest of the customer first in every decision affecting the operation of the business. The philosophy of public relations turns not upon the needs of industry but upon the needs of the customer. And upon what better ground could industry want to stand?

Public relations is not something that can be applied to a particular phase of business —nor is it an umbrella covering everything but touching nothing. It is rather a fundamental philosophy which turns not upon the needs of the industry but upon the needs of the customer. And upon what better ground could industry stand?

Let me go further and ask upon what better basis industry can go to the people and plead its franchise for continued service, so long as it offers through customer satisfaction a better way of living than has yet been developed through any other known system?

But it is no longer sufficient that business produce goods or services of the kind customers want at a price that customers can pay. Although heaven knows that in itself is hard enough to do. In addition—and here we break into a new field of management responsibility—business must provide and dispense those goods and services in a manner to win general approval and under circumstances that will promote social as well as economic progress. The great lesson that business is learning is that people are interested in more than just the product and the price. They are interested in the way things are done, in what might be called the social products of industry.

Defined broadly, good relations with the consuming public is not something that industry can achieve through publicity or through the activities of a particular department of the organization. Public relations is not a specialized activity like production, engineering, finance, sales. It is rather something that cuts through all these as the theme for each. It is an operating philosophy that management must seek to apply in everything it does and says. It is the philosophy of saying sincerely things people like—and saying them the way they like. It is more. It is the philosophy of doing things people like—and doing them the way they like. And, remember this, the doing is more important than the saying. But the doing alone is not enough.

Not everyone in industry understands this constructive philosophy of public relations. And so too many of our so-called public relations efforts to date have been defensive measures. We have been engaged in putting out fires rather than in removing the causes of trouble by building durably for the future. In some quarters the desperation of circumstances has encouraged a naive mixture of faith and hope that this thing called public relations would really turn out to be a new form of industrial salvation, atoning for past sins and promising a blissful future. Press agents, hack writers, publicity hounds, lobbyists psychoanalysts, pseudo-scientists, straw vote experts and dozens of other "specialists"—good, bad and indifferent—have been drafted to perform that psychological face-lifting operation known as "molding public opinion." The result has ranged from the ludicrous to the tragic. But above all it has been refreshing, for it has evidenced a groping for new standards. We are beginning to find that there is more to public relations than patching up the mistakes of the past or providing temporary and soothing substitutes for sound management policies which should be in operation.

I think it must be apparent that the typical handling of public relations in the past will not measure up to the requirements of the future. I think it must be apparent that—as might be expected in a field so new—nowhere is there to be found a public relations man who would claim to measure up to the requirements of today. We long ago passed the era of press agentry, but rare indeed is the organization or man that has better than a child's grasp of what will be required through the broadened public relations approach of the years to come.

Indicative of the ever-changing concepts through which public relations is groping to find its true place in business is the rapidly shifting balance of responsibility placed upon industrial managements. For example, the company with which I happen to be associated is in this year 1938 beginning its fourth decade of growth. Looking back over its major problems by decades you see an interesting cycle of change in emphasis on the elements that have demanded the attention of its executives. When it began in 1908 it was concerned primarily with financing —putting the pieces together. The second decade might be regarded as an engineering, production era. The third, merchandising. But I have noticed that as it enters its fourth and present decade of growth the major problems that occupy the thought of executives bear on public relations in one way or another. And the burden of successful management everywhere in industry is moving in the same direction.

As we pass into an era when industry seeks a more sensitive touch with consumer wants, leadership in industry will pass to men who first of all make it their business to study human relations with just as much science as they now study materials and methods. It will pass to executives who understand that the major problems in the future will be with governments and with people. And the time will come in your life and

(*Turn to page* 614, *please*)

Just Among Ourselves

"Multiplying the Rabbits"

IN Detroit, on April 26, we saw one of the most curious feats of sorcery in the recent history of the industry. Several hundred motor vehicle dealers came to the NADA convention to participate in a program whose number-one act was provided by the Federal Trade Commission, in the form of a Trade Practice Conference. Most of the scenario for this part of the program was prepared by the legislative committee of the NADA. As we understand it, only a certain Rule 20 (see page 605) was injected into the script by the kindly Commission.

The day before the play received its first performance most of the audience seemed to have a pretty hazy idea of just how the FTC got into this particular piece of business. But by the next day reading texts had been circulated and it read pretty well to the boys, except for that Rule 20 business, so many of them were in a mood to applaud heartily without worrying too much about the auspices of the production. And by that time, a lot of the "everything's going to be just dandy" sentiment had got around, so everything was just dandy.

By the time the play opened the dealers in the audience were prepared to applaud practically everything about it except that troublesome Rule 20 and a trifling failure to mention that turning back speedometers to zero on used cars was done by the very best dealers without any loss of social prestige.

The whole thing came off beautifully. Hundreds of dealers left the meeting feeling that they had witnessed the enactment of a new Magna Charta.

Some of the program notes which follow would undoubtedly seem of trifling importance to a large portion of the audience at the opening, but it's possible they may have some bearing on the future success of the play, so we're going to set them down at the risk of detracting from the magic.

First of all, there was the little matter of the play's title. It was billed as "Suggested Trade Practice Rules for the Automotive Industry." It became apparent as it progressed, however, that it was intended to apply only to a segment of the industry's activity: motor vehicle retailers and the relation between manufacturers and dealers. Piffling failure to define the extent of the code brought representatives of many other branches of the industry to the meeting. Some of them seemed affected by a curious feeling that if the play were talking about them they might have been consulted. Attempts to find out exactly to whom the text applied were met by a high-minded indifference to such petty detail. And besides, the dealers were strengthened by the daffy conviction that this was their play.

Of course there were some words in the prologue about the whole business being in the public interest, but anyone who let that worry him for a moment must have felt a lot better about it after the one gentleman who presumed to speak for the public interest was roundly booed. Think of it! Besides injecting a sour note like that into our lovely play, the dope was in favor of Rule 20. Some other nonsense about giving car purchasers an itemized invoice got into the first draft of the text, but that was taken care of with hardly a ripple in the performance.

In spite of the nice prologue which explained all about how the FTC had promulgated something like 200 other dandy codes for other industries and that everything had been practically jake in those industries ever since (and incidentally, fellows, don't let the word Commission scare you; they're just a bunch of nice non-partisan fellows who go around practically oozing with the desire to help industries like ours), there were still some misguided souls in the audience who wondered how the FTC could promulgate and enforce a code for an industry which has never been held to be in interstate commerce.

Like a magician we know who precedes his best trick by saying, "I usually get t'underous applause for this act," the NADA legislative committee seemed to think they'd put on a pretty good show for the boys. And their public appreciated it handsomely. It was as good as seeing 200 rabbits conjured out of a midget's undersize derby.

But, to revamp a phrase from one of our advertisers, "Multiplying the rabbits doesn't necessarily multiply the profits."

HERBERT HOSKING.

680 Operations Produce a Chevrolet

By JOSEPH GESCHELIN

APPROXIMATELY 680 operations are performed in the production of the Chevrolet carburetor body at the Chevrolet Bay City Division of General Motors Corp., Bay City, Mich., and the machining line includes a single battery of 10 multiple head Kingsbury automatic drilling and tapping machines.

The first two of these machines are alike, and are of non-indexing type. The other eight are of indexing type and have as many as seven stations each. The only machine work on the carburetor body preparatory to the Kingsbury operations is done on two Footburt drilling machines which perform the following operations:

(a) Rough and finish bore air horn hole and venturi radius.

(b) Drill and ream throttle flange holes.

(c) Rough and finish bore throttle bore and venturi taper.

(d) Mill bowl face and throttle flange face.

The air horn hole, throttle bore, and throttle flange holes are used for

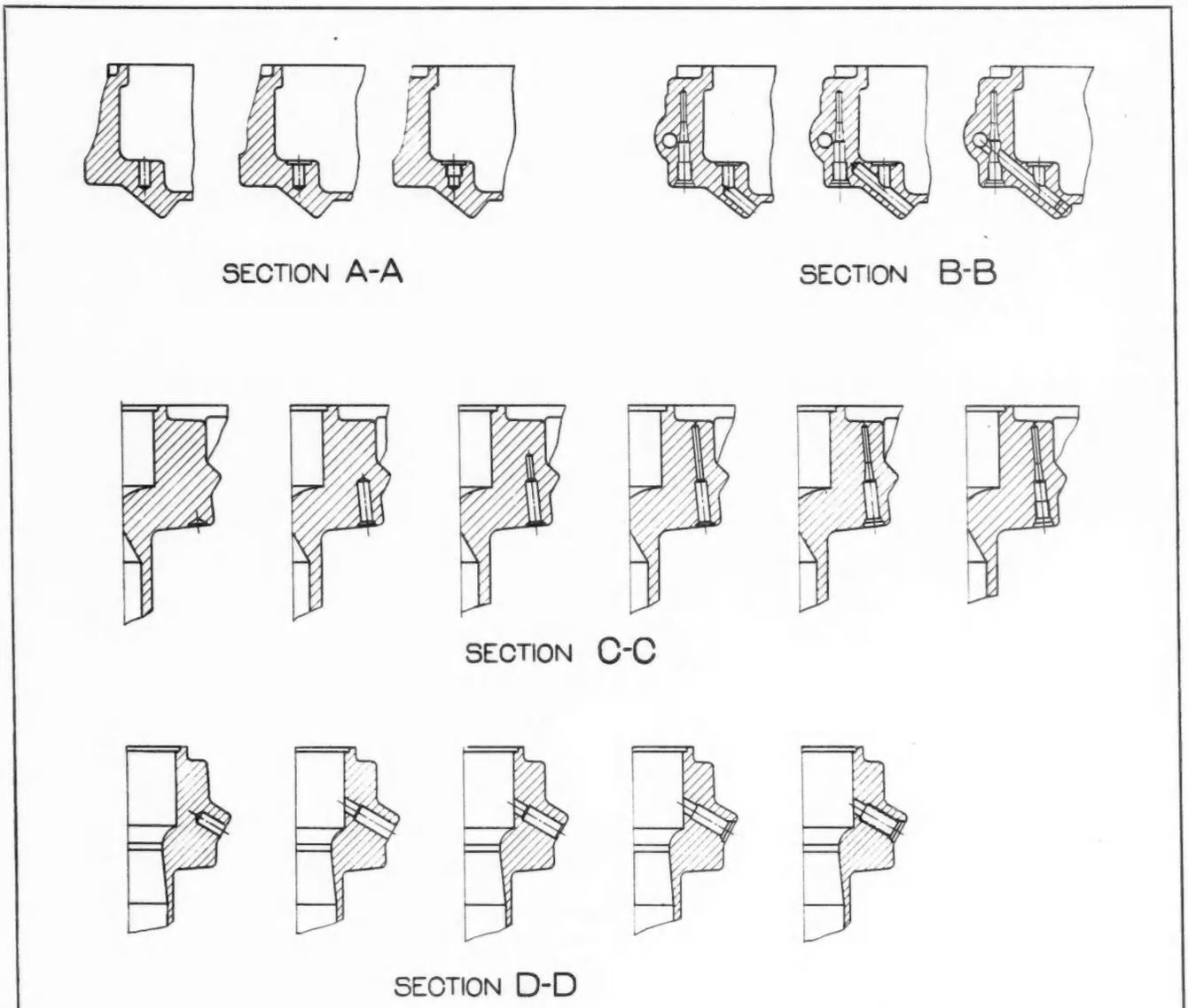


Fig. 1—Cross-sections through a family of inter-connected passages in Chevrolet carburetor. Sketches designed to show sequence of separate operations required to produce each passage on multiple-head Kingsbury drilling and tapping machines

locating on the Kingsbury fixtures.

Sectional views showing the interrelation of the nozzle hole, low speed jet hole, diagonal cross hole, and the metering jet hole, are reproduced in Fig. 1. Although each of the holes is of different form and in various positions of angularity with respect to the principal axes of the body, the three holes are connected by the

Carburetor

Fig. 2—(Above) General view of line of ten Kingsbury machines

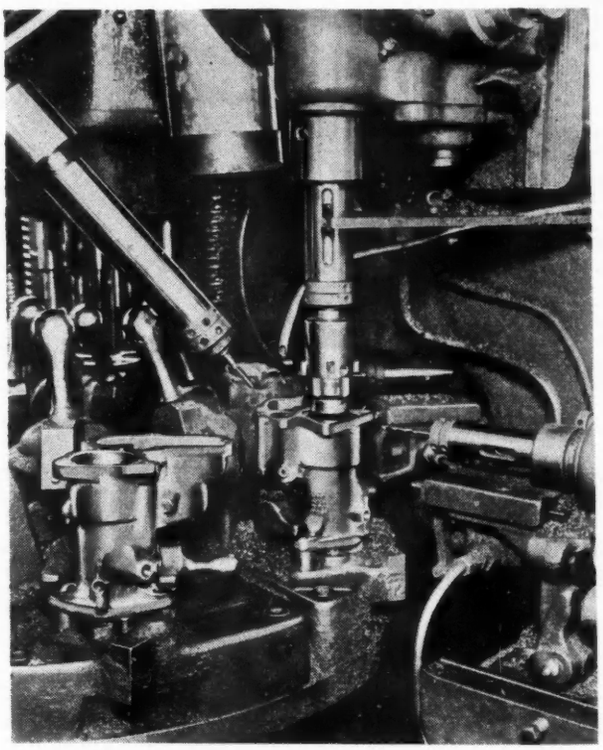


Fig. 3 — (Left) Close-up of the last machine in the battery, a six-station, multiple-head set-up

diagonal cross hole which is plugged by a copper rivet on the outside end.

The machining stages were developed cooperatively by the machine builders and the Chevrolet organization. It was necessary to make layouts of the position of the heads for each machine in order to decide clearance for spindles, loading accessibility, and time required for drilling so that each machine could be timed approximately the same and with the proper sequence of operations.

To avoid chip interference from one index station to the next, it was advantageous in some instances to place a subsequent operation on another machine so that the chips could be removed before reloading. In some cases, bushings were fastened to the heads while in other cases they were made part of the fixture. The latter method made it necessary to start with the largest size drill so that the tools would clear the bushing in subsequent index positions.

Wherever it is necessary for a drill to break into and adjacent to a previously drilled hole, the feed of the spindle is reduced at this point to minimize drill run and drill breakage.

Heads are tripped by air; spindles are cam fed. The air system on each machine is designed to synchronize the heads so that the index table cannot operate unless all heads are in the idle position. Where an unusually long approach of the tool to the work is required beyond the limits of the head spindle, an air slide is used to bring the entire head into position.

Fig. 2 is a general view of the battery of 10 Kingsbury machines. Of these, the No. 1 machines (two in number) each take care of the following operations:

(1) Drill throttle shaft holes from each side.

(2) Drill by-pass clearance hole.

(3) Drill vacuum control hole.

(4) Drill 7 cover holes and spot-drill air horn vent diagonal cross hole.

Steps in the process of drilling the cluster of passages indicated in Fig. 1 are as follows:

Section AA taken through the metering rod jet hole, requires three heads to completely machine:

First head—Drill No. 4 hole.

Second head—Spotface.

Third head—Tap.

Section BB taken through the diagonal cross hole, also requires three heads to completely machine:

First head—Drill No. 4 hole one-third depth.

Second head—Drill No. 4 hole two-thirds depth.

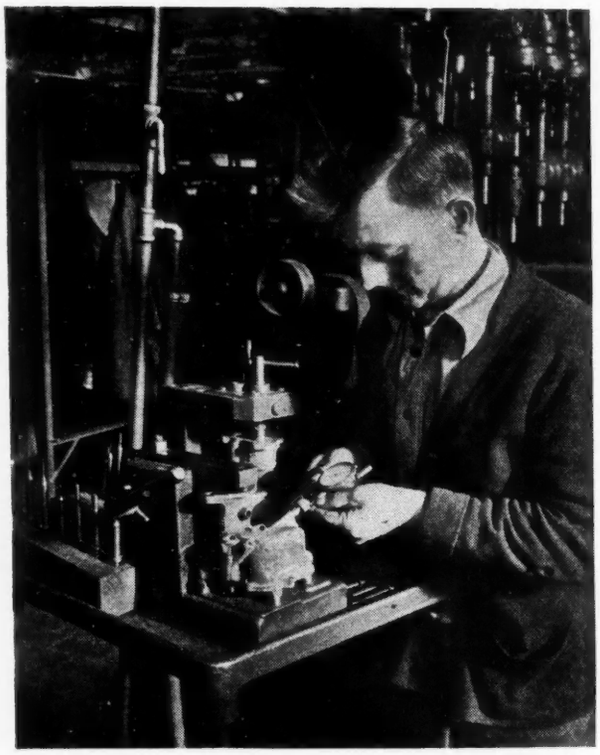


Fig. 4 — One of the inspection gages for checking machined carburetor bodies

Third head—Drill No. 4 hole full depth.

This hole is divided into three drilling stages to bring the index station time in line with the time requirements of other heads on the same machine.

Section CC taken through the low speed jet hole, requires six heads to completely machine:

First head—Spot drill to break scale.

Second head—No. 4 drill.

Third head—No. 33 drill half depth.

Fourth head—No. 33 drill full depth.

Fifth head—Counterbore and taper ream.

Sixth head—Tap.

Two of these heads are placed on one machine; four on another.

Section DD taken through nozzle hole, requires five heads to machine:

First head—No. 2 drill.

Second head—First combination drill.

Third head—Second combination drill — ream and break scale for counterbore.

Fourth head—Counterbore.

Fifth head—Tap.

The sequence of operations mentioned above is not always completed on one machine, nor are these operations the only ones handled in each machine setting. As an illustration, we give below the operations on the Number Five (five-station) Kingsbury. The sequence of operations takes in not only the three separate operations for completing the diagonal cross hole, but a number of other elements as well.

Station 1.

(a) Drill valve check diagonal cross hole to 1/3 depth.

Station 2.

(a) Combination drill valve check hole first step.

Station 3.

(a) Drill valve check diagonal cross hole to 2/3 depth.

(b) Drill 17/64 dia. valve check hole second step.

Station 4.

(a) Drill valve check hole third step.

Station 5.

(a) Drill valve check diagonal cross hole full depth.

In the arrangement of drilling functions, the operations on the first five machines take all holes with bowl end up. The next four machines reverse the position of the casting—with bowl end down—permitting the drilling of holes from the opposite end. The last machine again takes the casting with bowl end up.

Acetylene Black—A New Industrial Material

THERE are several types of industrial "blacks," each made from different raw materials, and each possessing different characteristics: gas blacks, lamp blacks, bone blacks, charcoal blacks, and iron oxide blacks. Most serve as pigments, but some are used in the compounding of rubber, decolorizing and deodorizing of liquids, adsorption of gases, and in dry batteries. Carbon black, made from natural gas, is the most important and is best known from its use in automobile tires, contributing increased mileage.

A less familiar black, as pointed out in the February issue of the *Industrial Bulletin* published by Arthur D. Little, Inc., is acetylene black which is made from acetylene, the gas generated by the action of water on calcium carbide. Higher price restricts its present application to quality use such as in the manufacture of racing tires, but by virtue of special properties it is occasionally replacing cheaper gas blacks. The largest special use is in dry cells.

It has been found that this black possesses excellent heat insulation properties. It is a very bulkly material with an apparent density, as produced, of only 1.4 lb. per cu. ft., which can be increased by compression to as high as 14 lb. Its graphitic character is indicated by a true density close to that of graphite, and a low electrical resistance approaching that of graphite.

The ability of this black to absorb liquids is interesting—one gram of the material being capable of absorbing five grams of linseed oil or 20 grams of water.

In tinting values for paints and lacquers acetylene black gives a bluer undertone and a duller finish than natural gas blacks.

Suggested Trade Practice Rules

(Continued from page 591)

Rule 20. Trade-In Allowances.

It is an unfair trade practice for any member of the industry, directly or indirectly, to enter into or take part in any agreement, combination, conspiracy, concert of action, understanding, or scheme of two or more members of the industry, or of any industry or other organization of members, for the purpose or with the effect of fixing, depressing, controlling, or otherwise restraining the so-called trade-in allowances for used motor vehicles or the price or prices any member of the industry may pay or allow for used motor vehicles.

Rule 21. Selling Below Cost.

The practice of selling new industry products below the seller's cost, with the intent and with the effect of injuring a competitor and where the effect may be substantially to lessen competition or tend to create a monopoly or unreasonbly restrain trade, is an unfair trade practice; all elements recognized by good accounting practice as proper elements of such cost shall be included in determining cost under this rule.

Rule 22. Robinson-Patman Act.

(a) Prohibited Discriminatory Rebates, Refunds, Discounts, Credits, and Other Price Differentials. It is an unfair trade practice for any member of the industry engaged in commerce 1, in the course of such commerce, to grant or allow, secretly or openly, directly or indirectly, any rebate, refund, discount, credit, or other price differential, where such rebate, refund, discount, credit, or other price differential effects a discrimination in price between different purchasers of goods of like year, model, type, grade, and quality and where either or any of the purchases involved therein are in commerce 1 and where the effect thereof may be substantially to lessen competition or tend to create a monopoly in any line of commerce 1 or to injure, destroy or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination or with customers of either of them: Provided, however,

(1) That the goods involved in any such transaction are sold for use, consumption or resale within any place under the jurisdiction of the United States;

(2) That nothing herein contained shall prevent differentials which make only due allowance for differences in the cost of manufacture, sale or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered;

(3) That nothing herein contained shall prevent persons engaged in selling goods, wares or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade;

(4) That nothing herein contained shall prevent price changes from time to time where made in response to changing conditions affecting either (a) the market for the goods concerned, or (b) the marketability of the goods, such as, but not limited to, actual or imminent deterioration of perishable goods, obsolescence of seasonal goods, distress sales under court process, or sales in good faith in discontinuance of business in the goods concerned.

(b) Prohibited Brokerages and Commissions. It is an unfair trade practice for any member of the industry engaged in commerce 1, in the course of such commerce, to pay or grant, or to receive or accept, anything of value as a commission, brokerage, or other compensation, or any allowance or discount in lieu thereof, except for services rendered in connection with the sale or purchase of goods, wares, or merchandise, either to the other party to such transaction or to an agent, representative, or other intermediary therein where such intermediary is acting in fact for or in behalf, or is subject to the direct or indirect control, of any party to such transaction other than the person by whom such compensation is so granted or paid.

(c) Prohibited Advertising or Promotional Allowances, Etc. It is an unfair trade practice for any member of the industry engaged in commerce 1 to pay or contract for the payment of advertising or promotion allowances or any other thing of value to or for the benefit of a customer of such member in the course of such commerce as compensation or in consideration for any services or facilities furnished by or through such customer in connection with the processing, handling, sale or offering for sale of any products or conmodities manufactured, sold or offered for sale by such member, unless such payment or consideration is available on proportionally equal terms to all other customers competing in the distribution of such products or commodities.

(d) Prohibited Discriminatory Services or Facilities. It is an unfair trade practice for any member of the industry engaged in commerce 1 to discriminate in favor of one purchaser against another purchaser or purchasers of a commodity bought for resale, with or without processing by contracting to furnish or by furnishing, or by contributing to the furnishing of, any services or facilities connected with the processing, handling, sale or offering for sale of such commodity so purchased upon terms not accorded to all purchasers on proportionally equal terms.

(e) Illegal Price Discrimination. It is an unfair trade practice for any member of the industry or other person engaged in commerce 1 in the course of such commerce to discriminate in price in any other respect contrary to Section 2 of the Clayton Act as amended by the Act of Congress, approved June 19, 1936 (Public No. 692, 74th Congress), or knowingly to induce or receive a discrimination in price which is prohibited by such section as amended.

Note: 1 As herein used, the word "commerce" means trade or commerce among the several states and with foreign nations, or between the District of Columbia or any territory of the United States and any state, territory, or foreign nation, or between any insular possessions or other places under the jurisdiction of the United States, or between any such possession or place and any state or territory of the United States or the District of Columbia or any foreign nation, or within the District of Columbia or any territory or any insular possession or other place under the jurisdiction of the United States; Provided, That this shall not apply to the Philippine Islands.

Rule 23. Misrepresentation of Price of Used Car.

It is an unfair trade practice for a dealer to advertise for sale at a bargain price a certain model and year of used motor vehicle when in fact he does not own or have in his possession such vehicle, with the tendency, capacity or effect of misleading or deceiving purchasers, prospective purchasers or the consuming public.

Rule 24. Deception "Finance Charge Packing."

It is an unfair trade practice for any member of the industry, either individually or in collusion with a finance company or other agency, to engage in a practice known as "finance charge packing," for the purpose or with the tendency, capacity or effect of misleading purchasers or prospective purchasers as to the actual trade-in allowance granted on the used motor vehicle taken in trade, or as to the amount or nature of insurance, interest or carrying charges to be paid on the vehicle sold, or in any other material respect.

Rule 25. Specifying Specific Finance Company.

It is an unfair trade practice for any member of the industry to coerce his dealer or dealers into disposing of sales finance contracts to a specific finance company selected by such member under threat of cancellation of franchise or through other coercive means.

Rule 26. Anti-Coercion.

(a) It is an unfair trade practice for any member of the automobile industry, his or its distributors, agents, or representatives to force or attempt to force his or its dealer or dealers to purchase automobiles, parts, accessories, equipment, tools or allied products, which are not needed or desired or which are not voluntarily ordered, by the use, directly or indirectly, of threats, coercion, intimidation, or duress, or by any other unlawful means.

(b) It is an unfair trade practice for any member of the industry, his or its distributors, agents or representatives to compel or attempt to compel his or its dealer or dealers to enter into new and more costly leases, purchase new premises, or build new buildings, which are not needed or desired by said dealer or dealers, by the use, directly or indirectly, of threats, coercion, intimidation or duress, or by any other unlawful means.

(c) Offered as non inclusion.

Rule 27. Oral Inducement.

It is an unfair trade practice for any member of the industry to induce persons, firms, or corporations to enter into franchise or agency agreements involving the purchase and sale of automobiles, trucks, accessories, etc., through misleading or deceptive statements or representations as to sales and profit possibilities or through any other type of misrepresentation.

Group II

Rule A. Cancellation of Contracts.

The cancellation by either party to a manufacturer - dealer franchise without cause and without due and reasonable notice is condemned by the industry.

Rule B. Itemized Invoice.

For the protection of the consumer or purchaser of motor vehicles, it is the judgment of the industry that the dealer should deliver to the purchaser an itemized invoice which should clearly and definitely show the list price or sale price of the new automobile with standard equipment, the amount of the transportation charges from factory to point of destination, the amount of the sales tax and Federal excise tax, the amount of the cash down payment, the amount credited the buyer for any trade-in and a description thereof, the amount of the finance charge, the amount of any other charge specifying its purpose, the net balance due from the buyer, the terms of the payment of such net balance and a summary of any insurance coverage to be effected.

Rule C. Arbitration.

The industry approves the practice of handling business disputes between members of the industry in a fair and reasonable manner coupled with a spirit of moderation and good will, and every effort should be made by the disputants themselves to compose their differences. If unable to do so, they should, if possible, submit these disputes to arbitration.

Rule D. Accounting.

It is the judgment of the industry that each member thereof should independently keep proper and accurate records for determining his or its costs.

Damping Claimed as Most Important

THE car suspension and ride session of the SAE National Passenger Car Meeting was opened by Roy W. Brown, in charge of the Air-Spring Division of the Firestone Tire & Rubber Co. Mr. Brown presented the factors which affect passenger comfort pictorially, as branches of a "tree of comfort." This tree had three major branches—road factors, car factors, and human factors—and each of these had a number of sub-branches, the individual car factors, for instance, being tires, springs, shock absorbers, and cushions.

The various elements of the road factor, the author said, may be directly measured. The Bureau of Public Roads, State Highways Departments, and others are now measuring the more important elements. It remains to study the cause and effect of secondary vibrations excited in the car structure by road-surface conditions. The car factors relate largely to the suspension and are interrelated with the road and human factors. The human factor unfortunately is not so readily measured. Some excellent work has been done in evolving means of measuring the effects of discomfort and fatigue on the human body, and was dealt with in the final report on the measurement of riding comfort presented at the S.A.E. 1933 annual meeting by Dr. F. A. Moss. It remains to apply the methods evolved and to correlate the results with average passenger reaction.

Methods of measuring spring rates under static conditions are well known. Maurice Olley in his 1934 paper on Independent Wheel Suspensions pointed out the desirability of making such measurements on the car in motion. Measurement of the dynamic properties of shock absorbers is now common. Occasional measurement of spring rate under dynamic conditions has brought out some startling inconsistencies with the static rates.

A study of the various factors led the author to the conception of riding comfort as a series of instantaneous results of all conditions causing movement of the passenger, and he developed a precision machine for measuring the combined dynamic properties of the spring and shock absorber. Mr. Brown concluded his paper with the statement that from the dynamic point of view damping appears to be the most important single factor which, if applied more extensively to all of the elastic parts and systems, will further increase passenger comfort.

"Ride Engineer" Introduced

THE damping of the sprung masses, particularly in cars with independent front and conventional rear suspension, was discussed in a paper by C. R. Paton of the Packard Motor Car Co. The author emphasized the importance which control of the riding characteristics has assumed in the development of passenger cars. He introduced the term "ride engineer," comparatively new in automotive terminology, and outlined the duties of this new species of engineer as follows:

"When the ride engineer starts to develop a ride, he usually is faced with certain definite limitations as regards weight distribution, spring rates, suspension type, etc. After these factors are established by the designers, it becomes his duty to develop the best result possible within the limitations imposed by the restrictions of the design. The ride engineer is usually charged with the responsibility of establishing proper damping of the several elastic systems involved, including those represented by the tires, the suspension springs, the suspension linkage, the steering linkage, the frame and body structure, etc. This damping is usually obtained by a combination of static and dynamic friction obtainable in the suspension springs, the spring mountings, the steering linkage, and the bearings in the front suspension linkage, as well as by means of the valving which determines the damping provided by the hydraulic shock absorbers."

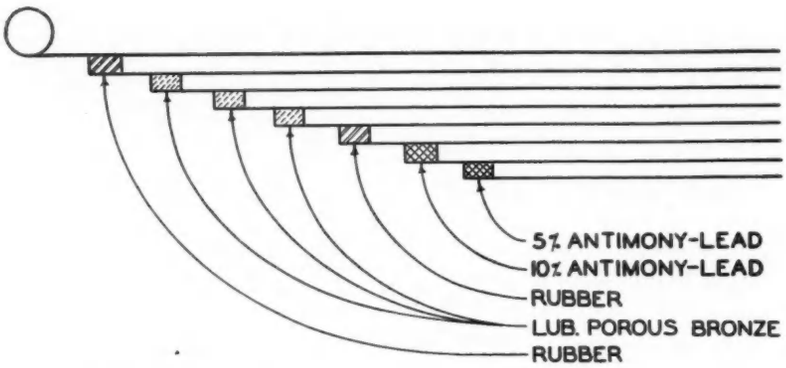
According to Mr. Paton, the improvement in the ride that came with the introduction of coil-spring independent front suspension was due not solely to the great reduction in spring rates, but in large measure to the reduction in the friction level. Experience with leaf springs has been to the same effect. Where there is a low friction level in either the front or the rear springs, supplementary cushioning means, such as large-capacity rubber bumpers, must be provided.

The normal ride is greatly affected by the weight distribution of the sprung mass with respect to the wheelbase, but this factor is subject to many design limitations. Another factor of primary importance is the selection of spring rates, which latter, in turn, determine the static deflection of the springs. The aim of ride engineers is to obtain a "flat" ride, that is, to provide such a weight distribution and such spring rates that the center of longitudinal oscillation falls at an infinite distance from the center of gravity. In that case the sprung mass will always remain parallel to the ground and its motion will have no pitch component. It was pointed out in the discussion of the paper, however, by R. N. Janeway, that the sprung mass of an automobile always has two possible axes of longitudinal oscillation, and that if one of these is at an infinite distance, the other is at the center of gravity, and that if oscilla-

Table I—Characteristics and Effectiveness

Type of Bearing	Designation	X Static or Breakaway Friction	Y High Frequency Damping	Z Low Frequency Damping	Uses
Antimony Lead	AL	High, Adjustable by Antimony Percentage	Low	High, Twice that of Bronze	X, Z
Lubricated Bronze	B	Low to Medium	Medium	Medium	X, Y and Z
Rubber	R	Practically None	Practically None	Practically None	Zero Value of X, Y and Z

Single Factor of Riding Comfort



Different kinds of inserts are used under successive leaves of Packard rear springs.

tions around the latter axis are excited, a rather sharp pitching motion results.

Among the disadvantageous features of leaf springs are that their frictional values cannot be readily adjusted to permit balancing with the frictional values of other suspension parts, and that it is impossible to vary the vertical and transverse frictions separately. These limitations of conventional leaf springs have led to a number of modifications in spring design, including the use of wax-treated fiberboard liners between certain leaves in Cadillac and LaSalle springs, the self-lubricating bronze inserts used by Chrysler, and the low-friction, molded-composition inserts used by Nash. A new spring used by Packard can be given definite control calibration. It makes use of tip inserts made of metallic, rubber, and other non-metallic materials, located as shown in Fig. 1. The characteristics of these three materials are given in Table I, where they are designated by the letters *X*, *Y*, and *Z*. *X* represents the static friction or breakaway value, and *Y* and *Z* are two different "varieties" of kinetic friction. Both of these latter provide low-frequency damping, while *Y* provides only small high-frequency damping. As here used, "low-frequency" refers to frequencies up to 100 cycles per minute (sprung-mass frequencies), while "high frequency" means 400 to 600 cycles per minute (wheel bounce).

The static friction or breakaway value *X* can be readily changed by changing the antimony content of the lead-antimony bearings, which in practice is varied between 5 and 10 per cent. Small changes in the antimony content are readily detected in road tests, a difference of 2 per cent having been noticed by riders not aware of the change.

Lead-antimony inserts show nearly the same values when dry or lubricated with a light grease. In practice they are lubricated to insure against glazing of the surface, in which latter condition they sometimes produce a slight break-away click. At the specific loadings used in this application, the cold flow is negligible; with 5 per cent antimony it is just sufficient to enable the bearing to readily conform to the rough-forged spring-tip depression.

As noted in the table, the high-frequency damping value *Y* of the lead-antimony alloy is small. The low-frequency damping value *Z* of this alloy is large, however, being approximately twice that of lubricated bronze. A spring may be calibrated to secure a substantial range of variation of any one of the *X*, *Y* or *Z* values, without major change in either of the other two factors. Rubber has practically no *X*, *Y* or *Z* value, and is employed in the calibration to fill the remaining positions after the desired "calibration" of inserts and insert positions has been worked out. Control calibration is accomplished by starting with rubber inserts at all points and replacing certain of them with lead-antimony or bronze, as required.

Characteristic *X* may be used to obtain tire absorption of minor road irregularities without introducing harshness, and also for restraint of a pitching tendency. This characteristic provides "rear-support value" exactly equivalent on the road to a reduced rear compression orifice. It may, therefore, be used interchangeably with rear compression orifice where it is desirable to modify either factor.

Characteristic *Y* is used principally to establish the jiggle-jolt compromise and to supplement the hydraulic controls in suppressing wheel-bounce tendency. It is also used to obtain the proper level of spring lateral damping.

Characteristic *Z* is used to control slow swings and to restrain the pitching tendency. By placing lead-antimony inserts at the tips of the short leaves, a substantial compensation in added control can be obtained as the passenger load is increased and short-leaf tip pressure is correspondingly increased.

In practice it has been found possible, in some cases, to obtain the needed high-frequency damping (*Y* value) and necessary wheel-bounce control in the hydraulic shock absorbers, and in these cases an insert specification which entirely omits the bronze is found satisfactory.

Probably the most valuable and interesting characteristic of the lead-antimony inserts is the peculiar difference in damping ability at high and low velocities. Because this alloy provides strong damping at low velocity and weak damping at high velocity, and also because with it the static friction value can be so readily adjusted by changing the antimony percentage, it is very useful in maintaining a flat, pitch-free ride.

Spring Plates Have New Grooved Sections

RECENT Developments in the Design of Passenger Car Suspension Springs and Their Application was the title of a paper by Tore Franzen, experimental engineer of Chrysler Corporation. New sections for spring plates have been adopted recently in which the concavity of the sides is reduced from 0.005 to 0.001 in., and the steps in the gage sizes are more rational. The new section is claimed to make possible a saving of 3 per cent in the amount of material that goes into leaf

springs. Another innovation is the grooved-section spring plate, Fig. 1, with a lengthwise groove at the center of the section on the compression side. Experience has shown that progressive failures always start on the tension side of the plate. In the grooved section the stress is increased on the compression side and decreased on the tension side, with the result that the fatigue life is increased. Besides, the moment of inertia is increased, and in consequence a further saving of 7 per cent is made on the amount of material used. This new section is already in use by two prominent car makers.

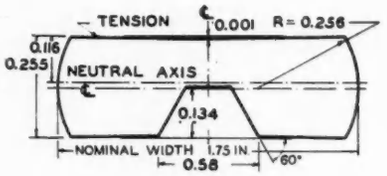


Fig. 1—Spring plate with lengthwise groove

Another new section (Fig. 2) recently adopted by a large car manufacturer, for a width of plate of 2 in. has a shallow groove at the center of each side, 0.47 in. wide and 0.015 in. deep. This, the speaker said, is slightly less efficient than the old S.A.E. standard section.

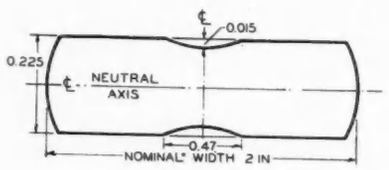


Fig. 2—Spring plate with shallow groove at the center of each side

Leaf ends usually are tapered, to avoid high local pressures. Metal covers containing rust-inhibiting lubricants are a great help in keeping the spring characteristics constant over long periods.

Spring inserts are again making their appearance, and one particularly noteworthy construction embodies several kinds of inserts: a rubber pad between the longer leaves, an oil-less bearing between some of the slightly shorter leaves, and inserts of lead-antimony between the shorter leaves. In another construction, now in its second year of use by a manufacturer of luxury cars, the springs are made of grooved-section plates which are separated by impregnated-fiber strips.

Open-end shackles, owing to their slight flexibility, protect the chassis from lateral blows, and rubber bushings on spring bolts and shackle bolts have a similar effect. The periodicity of the spring is materially influenced by the shackle angle. Threaded spring bolts are given enough clearance so that minor movements can take place without rubbing. All of the various types of rubber bushing illustrated in Fig. 3 (Silentblock, Inlox and Harris, the latter in both the cylindrical and conical types) are capable of absorbing slight lateral movement. Energy stored in these bushings is returned to the suspension system, and they therefore act as supplementary springs. The friction of the cotton-fabric type of bearing (Fig. 4) depends on the pressure on the fabric.

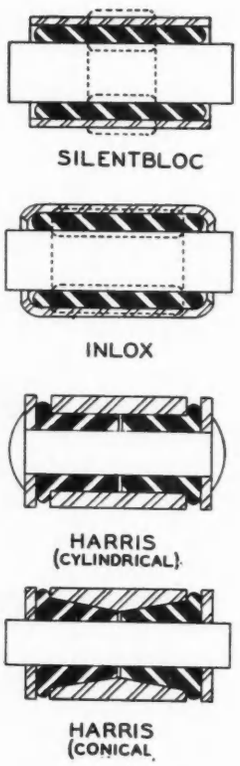


Fig. 3—Various types of rubber bushings

Spring connections must be so designed that there will be no noticeable sidesway, yet they should permit minor lateral motion, for the popularity of the so-called U-type threaded shackle and of rubber bushings shows that this is desired. The drive can best be taken on a relatively straight spring, and the camber must be kept down especially in the case of soft springs. Taking torque on leaf springs is becoming very troublesome as the flexibility of springs increases. The front spring of a 1927 medium-size car had a rate of 320 lb. per in. and carried a load of 960 lb. This spring under full torque rocked through an angle of about 9 deg. The front spring of a 1938 small car has a rate of only 105 lb. to the inch and carries a load of 680 lb., and in its case the rocking motion under maximum brake torque is held down to about 7 deg. by means of a torque-arm arrangement. When torque is applied, the torque member is put under compression and the rear half of the front spring under tension (Fig. 5).

Fig. 4—Friction of the cotton fabric type of bushing depends on the pressure on the fabric

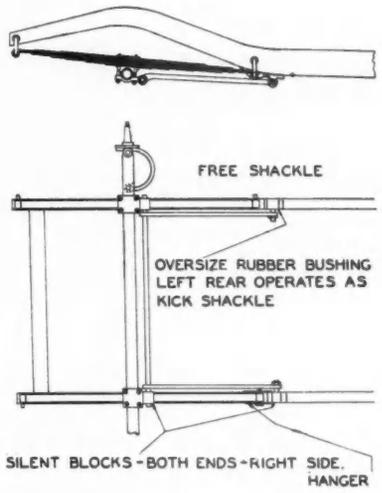


Fig. 5—Suspension designed to overcome sidesway

The author said that although steel had given good service as an elastic material in the past, and was still doing so, it was now being challenged by other elastic materials, particularly rubber and gases in compression. Both of these latter have much greater maximum resilience than steel; however, in making comparisons it must not be forgotten that gases can be used only in containers, and that rubber springs require special fastenings. The type in which gases are confined in rubberized fabric is well exemplified by the Firestone development described in AUTOMOTIVE INDUSTRIES of Feb. 15, 1936. From a cost angle the latter is practically on a par with conventional suspension systems, if its inherent damping can be made to meet all damping requirements. It

appears possible to get an agreeable ride, and air springs of the type referred to have excellent endurance qualities. The question of their adoption is one of overcoming the natural aversion to discarding a proven, simple construction for a more complicated one even though the latter be scientifically correct and experimentally proven.

MacBeth and several other European designers have developed suspensions employing rubber in torsion. Most of them use considerable amounts of rubber. In contrast thereto, an American experimental development applied to a well-known make of car uses only 3 lb. of rubber per spring, the periodicity being the same as with the conventional front spring used with this car, which weighs 15 lb. The metal parts holding the rubber and the increased weight of the lower control arms offset some of this gain. This application is illustrated by Fig. 6.

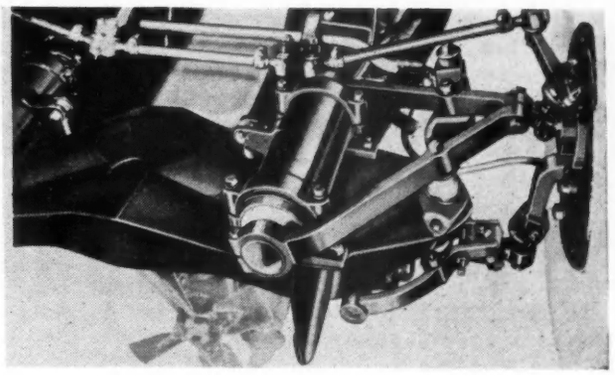


Fig. 6—An application of rubber in torsion

Among unsolved problems in connection with rubber suspensions are the following: What is the safe limit of bonding loads for regular production? To what degree does the peculiar behavior of rubber affect the ride when we apply it to still softer suspensions? These questions are now being seriously investigated.

Here is shown how Dodge cars are balanced. The unit being tested is a parking-brake drum.

Production Lines

Conditioned Air

Before it is too late, engineers and others must take care to distinguish between "ventilation" and "air conditioning" as applied to automobiles and buses. Air conditioning has a very precise technical definition. To be air conditioned, whatever we are talking about must envisage the control of the following fundamental elements — temperature (controlled heating and refrigeration), air velocity, humidity. If it doesn't do all of these, it isn't air conditioning. Much work is being done to provide more comfortable quarters in car interiors by adequate VENTILATION. The human being, after all, is endowed with a remarkably flexible thermodynamic system. Even when the air temperature is very high, the mere circulation of the air stream will produce comfort by aiding in evaporation and carrying off body heat. Several organizations are working along this line and promise an answer that is commercially attractive.

Materials Handling

Seventeen different types of conveyers, used alone or in combination, are described and illustrated in a handsome bulletin just issued by the Mathews Conveyer Co. Students of cost control in a manufacturing establishment know it to be a fact that one of the biggest economies lies in the mechanization of materials handling, and to these and others this bulletin should be of real interest. Among the types mentioned are the following—belt, drag chain, pallet, wheel, roller, etc.

Sulfurized Oils

Noted exponent of sulfurized cutting fluids D A. Stuart, of Chicago, has just issued a new edition of its handbook. Entitled "The Story of Sulfurized Cutting Oils," this little book discusses the commonly known cutting fluids and adds to this background some valuable data concerning the uses of Stuart specialized products. Tool engineers and production men will find this book interesting and instructive reading. Ask us for copies.—J. G.

Approximating Road Conditions in Tests of Oil Filters

THE general recognition of the importance of lubricating-oil filtration in the operation of internal-combustion engines has given rise to the problem of determining the performance of the various filters available, as an aid in making an intelligent selection. Following is a description of a simple test developed for this purpose by Motor Improvements, Inc., of Newark, N. J., and a discussion of the principles on which it is based.

Laboratory tests serve either as substitutes for, or checks against road tests, and it is, therefore, desirable that the conditions of road service be duplicated in the test as closely as possible. Conditions of temperature and pressure are known, but a point on which there seems to be some difference of opinion is with regard to the amount of dirt to be added to the circulating oil at one time. To determine the rate at which dirt is taken up by the oil supply, Motor Improvements conducted a series of tests in the "Dust Bowl" in the southwestern portion of the U. S., and over unimproved roads in different parts of the country in order to check on the worst possible conditions. Vehicles were driven over these roads without oil filters on the engines, and oil samples taken from the crankcase at regular intervals and tested showed that dirt accumulates in the oil gradually at a nearly uniform rate. From this the conclusion was drawn that the proper method of conducting the test would be by the addition of small amounts of dirt at intervals. The dirt used, moreover, should be of the same character as that formed in the crankcase in service and which is extracted from the drain oil by centrifuging. To facilitate handling of the dirt, it is mixed with an equal weight of clean oil, the mixture being thoroughly agitated so it will be homogeneous. This mixture, referred to as the "dirt stock," is, therefore, of a definite, known composition, and this makes it possible to tell exactly how much dirt is added during a test.

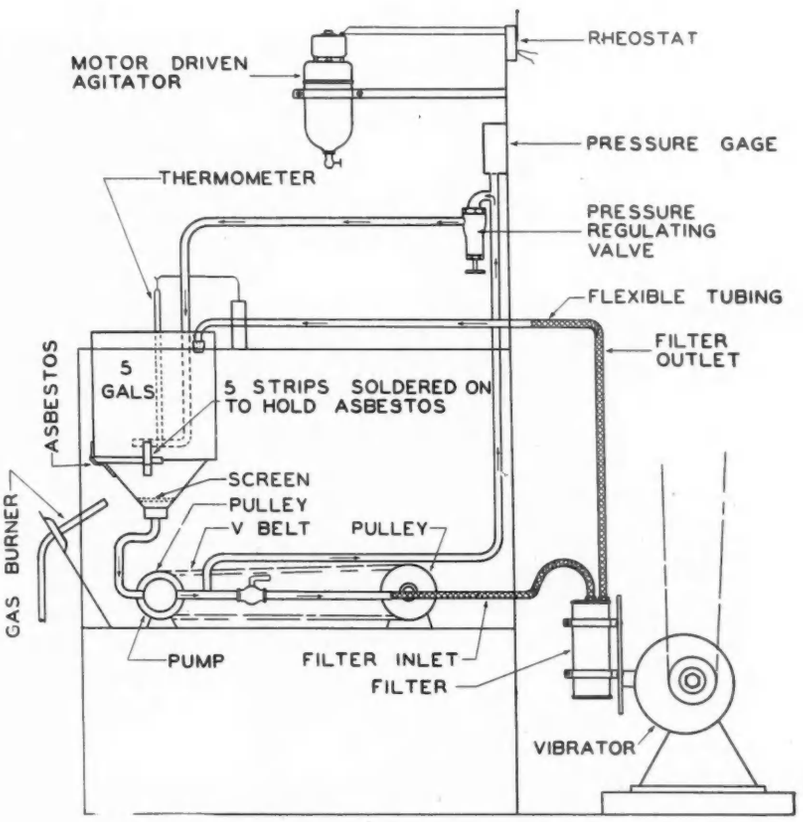


Fig. 1.—Diagrammatic view of the Motor Improvements testing unit

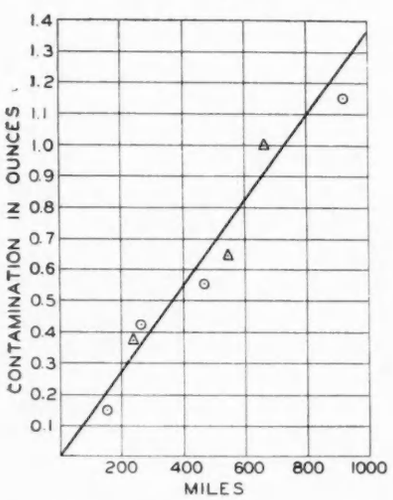


Fig. 2.—Contamination in crankcase shown in ounces per mile in two cars operating without an oil filter using "SAE 30" oil.

Fig. 1, herewith, is a diagrammatic view of a Motor Improvements test-stand unit. It is recommended by the makers that at least four such units be installed side by side, so that several tests can be run simultaneously, and the accuracy of the results increased by averaging those obtained from individual units.

A level gage (not shown in the drawing), consisting of a thin strip of soft metal, bent and hung over the inside edge of the oil tank, so that its end is even with the original level of the oil, serves as a guide in

adding new oil to make-up for the samples removed. The vibrator shown in the drawing is used only in extreme cases; it serves to test the physical strength of the filter and not its filtering ability, on which it is said to have little influence.

At the tank end of the outlet line from the filter there is a No. 56 drill hole, which may be opened up to increase the flow rates to that recommended by the manufacturer, if desired. It is recommended that this orifice be located in the outlet line of cartridge-type filters, and in the inlet line of depth or absorption-type filters, unless an orifice is provided in the filter. This orifice serves to control the pressures and flow rates. The height of the filter relative to the "crankcase" is immaterial, within reasonable limits.

In making a test, the oil tank or "crankcase" of the test unit is charged with as much oil as required for the crankcase of the engine on which the filter is to be used. A good grade of S.A.E. 30 oil is recommended. The valve on the filter inlet line is closed, so that no oil will reach the filter until pressure and temperature conditions are right. The motor which circulates the oil is now started, and the burner lit. During the test, the oil temperature is held constant at 160 deg. Fahr., and the pressure at 40 lb. per sq. in. As soon as these conditions are reached, the filter is cut into the system, and a reading of flow rate is taken. The orifice (either in the filter or in the filter inlet or outlet) should permit of a flow rate of 1 pt. in 26 to 28 sec. in the case of cartridge-type filters, and 1 pt. in 12 to 15 sec. in the case of depth or absorption-type filters.

When the flow rate has been adjusted, the test begins. Five cu. cm. of "dirt stock" is added to the "crankcase" every half hour. The oil thus contaminated is circulated between the "crankcase" and the filter, the dirt being thoroughly mixed with the crankcase oil by the discharge from the filter pouring back into the "crankcase."

At the end of every 2 hr., a sample is taken from both the filter outlet line and the crankcase—before the 5 cu. cm. of "dirt stock" is added. The samples taken are subjected to a centrifuge test to determine the amount of contamination they contain. Flow-rate readings should be taken—by means of a pint measure and a stop watch, for instance—at the same time as the centrifuge samples.

The test is continued until the filter plugs up, until the rate of flow has decreased so much that the filter has become useless, or until the centrifuge results indicate that the filter is no longer effective. One cu. cm. of the solids used to make the "dirt stock" is weighed, and when this figure has been obtained it is an easy matter to calculate the ounces of dirt which the filter will absorb or remove from the oil, it being remembered that in making the "dirt stock" the dirt was mixed with an equal weight of oil.

Motor Improvements, Inc., state that, owing to the great number of variables involved, it is difficult to give the relation between hours of operation in the test unit and miles in road service with any degree of accuracy. The best plan is to determine by road test without filter just what are the dirt-forming characteristics of the engine on which the filter is to be used. This can best be done by taking several vehicles of the model concerned, cleaning the engine and lubricating system by dropping the engine and pan, filling with fresh oil, warming up the engine, and taking a sample of sufficient size for the centrifuge test, at the same point at which the inlet line from the filter would be attached. The vehicle is then operated in the normal way. Four-ounce centrifuge samples are taken at 100-mile intervals for, say, 1000 miles, and from the centrifuge readings, which are the percentages of solid contamination by volume, it is possible to determine the ounces of dirt in the crankcase at the time each sample was taken by means of the following equation:

$$D = \frac{946A \times B \times C}{28.35} \text{ ounces of dirt}$$

solids, where A is the quarts of oil in the crankcase when the sample was removed:

B, the per cent contamination, and

C, the weight of 1 cu. cm. of dirt.

The constants in the equation represent cu. cm. per qt. (946) and grams per ounce (28.35). It has been found that the dirt (dry solids used to make the dirt stock) weighs 1.2 grams per cu. cm., on the average. By plotting the figures for ounces of dirt in the crankcase against miles run, and drawing a mean line through the points plotted, a record of the dirt-forming characteristics of the vehicle is obtained.

The capacity of the filter to be used, in ounces of dirt it will absorb, is known from tests. Assume, therefore, that the vehicle when tested without an oil filter accumulates 5 ounces of dirt in 5000 miles, and that tests have shown the filter to have a capacity of 10 ounces of dirt. It is then logical to assume that the filter, when installed on this vehicle, will have a life of 10,000 miles. Experience is said to have shown that the actual life of the filter is greater, and it is believed that the reason is that the rate of dirt formation is reduced if the oil is kept clean by an efficient filter.

Motor Improvements rates absorption-type oil filters on the basis of weight of dirt removed from the oil per unit weight of filtering material in the filtering element.

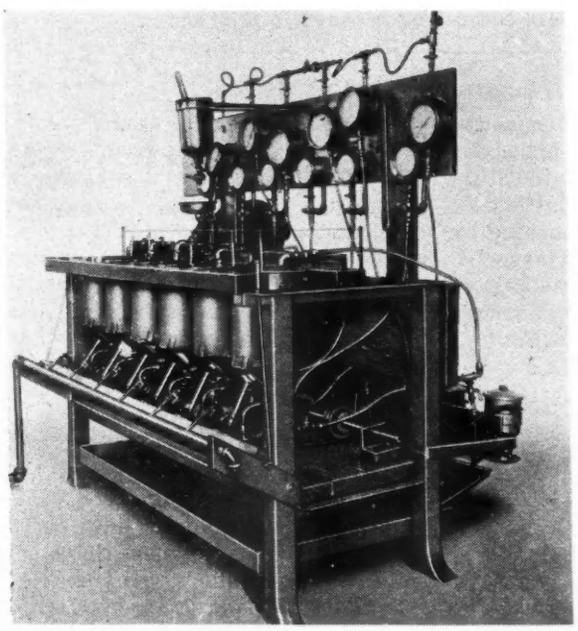
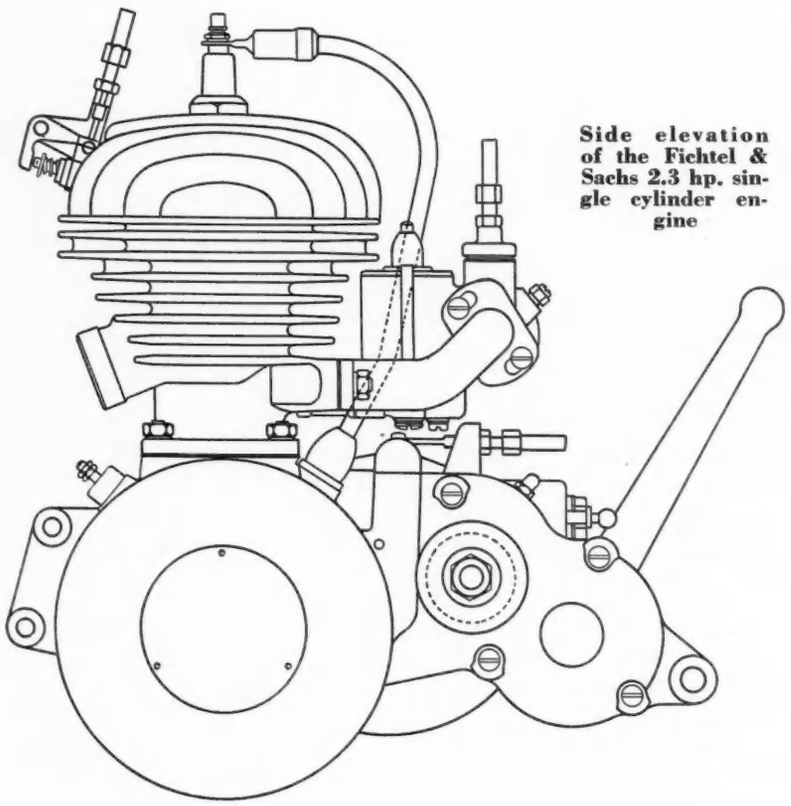


Fig. 2. — Photographic view of oil testing unit devised by Motor Improvements, Inc.

A Small Engine for Small Vehicles



Side elevation of the Fichtel & Sachs 2.3 hp. single cylinder engine

THE firm of Fichtel & Sachs is now introducing on the American market its small single-cylinder, two-stroke, air-cooled engine of 1⅞-in. bore and 2⅛-in. stroke (6 cu. in. piston displacement), which is suitable for use on bicycles, scooters, and miniature delivery vehicles and automobiles. It has a rating of 2.3 hp. at 3300 r.p.m. A performance curve of the engine furnished us shows a maximum power of 2.32 hp. at 3900 r.p.m., a torque remaining very close to 3.6 lb-ft. through the speed range 2000-3400 r.p.m., and a minimum specific fuel consumption of 0.88 lb. per hp-hr.

The cylinder is of cast iron, but most of the other structural parts and the piston are of aluminum alloy. There are two rings on the piston, which is of the deflector-head type. The crankshaft is counter-weighted and runs in two ball bearings, while the big end of the connecting rod contains a roller bearing. Combined with the engine is a two-speed transmission with reduction ratios of 4.42 and 6.50. The transmission also includes a multiple-disc clutch, and the crankcase, transmission and clutch housing are of aluminum alloy and assembled to form a single block in which all moving parts are enclosed dust-proof. The engine is designed for three-point mounting.

The carburetor, which was specially designed for this engine, is equipped with an air cleaner and an adjustable choke, and its fuel nozzle is interchangeable. A Bosch flywheel magneto of 15 watts capacity furnishes current for ignition and for a 6-8-volt lamp. Lubrication of all interior engine parts is effected by adding a heavy grade lubricating oil to the fuel in the proportion of 1:30 to 1:20. Transmission parts are lubricated by grease in the case, grease being added about every 2000 miles.

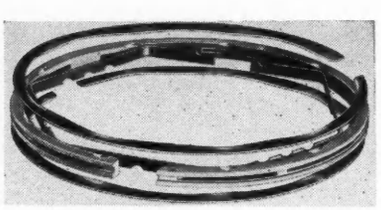
Among the achievements which the Sachs engine is said to have to its credit is a speed of about 40 m.p.h. maintained by a motorcycle over a period of 24 hours, in the Gold Cup race held in France in 1937. The engine which put up this performance was a stock machine specially adapted for the purpose by the manufacturers. A total of nearly 1000 miles was covered in the 24 hours. We understand that this engine is now being produced at the rate of about 100,000 per year, and that it has met with a favorable reception throughout the world.

A stock of engines and parts is being carried by Walter Romberg, Fichtel & Sachs correspondent, who maintains an office at 90 West Street, New York. Mr. Romberg also has on hand a number of light motorcycles fitted with this engine, which he uses to demonstrate its performance characteristics.

Burd "Segment" Piston Ring

A NEW piston ring, known as the "Super Hi-Speed," has been announced by the Burd Piston Ring Co., Rockford, Ill. It consists of two narrow steel rings separated by a complete cast-iron oil ring with an inner-spring.

The cast-iron member or spacer is very pliable, and has the "Quik-Seal" feature that has been used on Burd "Hi-Speed" oil and compression rings for several years. The steel inner-spring, which is made of Swedish blue steel, presses only against the cast-iron ring. This is said to be an innovation in this type of ring, which is employed to insure maximum flexibility without risk of cutting due to excessive tension on the steel members.



Burd "Super Hi-Speed" ring

The steel rings are rolled, and their outer edge is plane, while the inner edge is slightly waved. The undulations of the inner edge serve a double purpose; when the steel rings are in contact with the cast

(Turn to page 614, please)

Automotive Gear Design Demands Modern Methods

By R. S. DRUMMOND*

THERE is little doubt in the mind of the practical shop executive that good machinability is one of the most important attributes of any metal cutting job. Nothing is more destructive to a mass production operation than the experience of variable machinability on a standard set-up, i. e., fluctuation from good to bad machinability when all other conditions are apparently the same.

Probably every shop has had this experience at one time or another and either has accepted the situation philosophically and made the best of it, or has frantically set about to make radical changes in tooling or equipment, and even in the steel analysis, in an effort to correct the difficulty.

Mass production which is based upon a definite time cycle for every operation, and which relies upon a standard performance of tools and machines, cannot tolerate variations in machinability. Apart from the disruption of routine procedures, poor machinability decreases the tool life, making it necessary to break down the set-up for tool changes; increases rejections due to poor finish or non-conformity to standards in other respects; delays production, and greatly increases cost.

In modern gear manufacture, where gear blanks almost invariably are made from forgings, the cause of variations in machinability has been known for many years, but for same reason the facts have not been widely exploited, even among the largest metal-working establishments, with the result that even today many gear plants are confronted with what to them is an insoluble problem.

What are the facts about forging practice? We can say without hesitation that, given the right steel specification for a given type of gear, certain simple principles applied to forging practice will produce gear blanks free from any variations in cutting time, surface finish, and final results.

*President, National Broach & Machine Co.

Many years ago, H. W. McQuaid, then metallurgist for the Timken Roller Bearing Co., discovered that in the rolling of bar stock, the temperature of the finishing roll had a marked effect upon the machining quality of the material. In fact, the principle of high-temperature rolling of bar stock became a patented feature of Timken steels. For some years it has been a recognized principle that for good results, so far as machining and other characteristics are concerned, forgings must be formed at a temperature ranging between 2200 and 2250 deg. Fahr. However, as we said earlier, this fundamental fact has not been widely recognized, and trouble still is experienced in even the large gear plants.

Part 3

Concluding this treatise, Part One and Part Two of which appeared in the Nov. 27, 1937, and Mar. 26, 1938, issues of AUTOMOTIVE INDUSTRIES.

The recent formation of the Drop Forging Institute with headquarters in Cleveland is one of the most constructive moves to the solution of drop forging problems, and its activity should result in great benefit to industry at large through the dissemination of information as to good forging practice.

There are certain considerations in the design of gear-blank form which have an important bearing upon a certain natural tendency for geometrical forms to distort and change in form. One part goes through the fire with only 0.0005 in. distortion. An even larger part will come through with only 0.0008 in. distortion. And yet, a relatively small piece has 0.0012 in. distortion, while still another piece exhibits from 0.0025 to 0.0050 in. distortion.

All this boils down to a consideration of the best form compatible with the distortion expected in heat treatment. One manufacturer recently redesigned the form of gears so that instead of removing the metal between the end gears, the forging now is as solid as it can be produced. This results in a great improvement in fire-distortion effects.

An interesting example of what can be accomplished by redesign is that of certain bevel gears. The original construction exhibits an unusual degree of porosity, despite the fact that it is a relatively simple forging. Profiting by the experiences along this same line, the manufacturer changed his practice and pierced the end of the forging so as to force metal up into the toothed section. This produced a more nearly uniform distribution of metal through the forging and resulted in an improvement in distortion effect in the ratio of 10 to 1, as compared with the old design.

One very large motor-car builder has taken a still further step to minimize the effect of distortion, which occurs even under the best controlled conditions. They started by working back from the heat treat to find out how much fire distortion occurs under best conditions. The amount of distortion was accurately determined, and then the gear-tooth form in the green was altered from the conventional to compensate for this effect. Special cutters were designed for this purpose, and now the distortion has been made an integral part of the manufacturing process. By cutting the gear-tooth form off standard sufficiently, they use the normal distortion to bring the tooth form back to the desired theoretical form after suitable correction by lapping.

It is of interest to observe that everything we have brought out in the foregoing also applies to the manufacture of large gears for heavy-duty applications. The practice on such gears has been to correct tooth form after heat treatment, by grinding. And I have one job in mind, a 14-in. diameter gear of 6 pitch and 2-in. face width, that took 1½ hours to grind.

(Turn to next page, please)

The finishing time was reduced from 90 minutes to 16 minutes by making a simple change in procedure. If grinding must be done on large gears, it is far better to rough grind within, say, plus or minus 0.001 in. of accuracy and then to lap. In this case, the grinder was relieved of the final job by limiting it to roughing within 0.001 in. Then we added a lapping operation to remove and correct the final errors within 0.0002 in., in the short time of eight minutes or a total of only 16 minutes for finishing.

Summary and Conclusions

If we examine the gear problem, particularly as it relates to machinability and fire distortion, we are impressed with the fact that POROSITY is the predominating element. We have seen how it can be controlled and eliminated from the picture, and we submit that the correct forging practice must be insisted upon by everyone engaged in gear manufacture. Correct die design, correct blank form, and the right forging practice not only will erase the bugaboo of fabrication difficulties, but will result in a stronger and longer-lived unit, whatever be its function.

True, there are many variables involved in the making of steel and in its utilization. Steel analysis and steel control, grain size, rolling temperature, and many other factors have to be taken into account by the metallurgist. But given any reasonable set of conditions, the DENSITY of the forging—its freedom from porosity—may be considered as the ONE most important factor to control. By the same token, you can take the best steel and fabricate it under the most favorable conditions, but if the forging is porous the results will be most unsatisfactory, if not downright disastrous.

So far as our own outlook of the situation is concerned, eight years ago we were selling grinding machines for correcting gear tooth form. Then we saw the handwriting on the wall and began the development of lapping equipment. Today we are building at least three different types of lappers and naturally will continue to supply this equipment so long as there is a demand for the process.

However, we firmly believe that in the not too distant future when the facts brought out in this study are widely known, lapping will become simply a salvaging operation because gears will come through the fire with so little distortion that no further correction will be needed in quantity production.

For large hardened gears, in diameters of 24 in. and over, grinding probably will be required for a long time to come, although the cost of finishing can be materially reduced as described above. In large gears of this size, distortion remains a big problem if for no other reason than the effects of size and mass.

The Industry's No. 1 Job

(Continued from page 600)

mine when the big jobs in industry will be bossed not by the technicians on production, engineering or merchandising but by the generalissimo of public relations—the man who in his comprehension of the practical factors in the business includes also understanding of the influences that move men's minds and hearts.

The problems which occupy the greater part of the time and attention of the industrial leader of today were scarcely heard of ten years ago. Tomorrow, business and industrial executives will be on as familiar ground in the realm of human relations involving public attitudes, customer reactions and the whole range of social sciences known as the humanities, as yesterday they were in the field of production. The leaders of industry who are blazing new trails in industrial management are precisely men of this type. And ten years from now American industrial leaders as a group will have become experts in this new field, just as they always have learned to become experts in every field on which industrial progress depended.

Thus, far from being a program of defense, or an academic experiment in mass psychology, public relations, as a philosophy of management, projects itself inevitably in terms of concern for human beings —for higher standards of living. For what is this thing we call the standard of living but an economic name for how well people's wants are being satisfied?

Now I suppose there is nothing of which we can be so proud, or to which the world points with so much envy for the example it provides of human progress, as the high standard by which we nearly all live in America. With 6 per cent of the world's population, we have 50 per cent of the world's telephones. We have 44,000,000 savings bank depositors. We spend more for education than all the rest of the world. We have 64,000,000 people protected through life insurance. We have a radio for every six persons. We have enough automobiles for every man, woman and child to go riding all at once on a Sunday afternoon.

Such proofs of the validity of our system of free enterprise are not monuments merely to be gazed at in wonder, or values only for future generations. They are benefits in use here and now by people, by men and women, by the customers of our economic system. Yet most of these men and women do not possess even a rudimentary knowledge of the source of their common comforts. Nobody has ever made more than a feeble effort to explain why these benefits exist here and do not exist in any other country in the world.

Have we done all we can to make people understand these fundamentals? Have not you and I unwittingly allowed influences to seep into our land that will destroy our American standard of living unless we correct some public misconceptions soon? Have we not allowed concepts to grow up that are a threat not alone to capital, to labor—to industry big and small—but to the well-being of the American consumer himself? Is it not a challenge to you and me as public relations ambassadors not to duck but deal with the job of meeting these present-day fallacies?

Part Two will appear in an early issue

Burd "Segment" Piston Ring

(Continued from page 612)

iron rings, the undulations provide a breathing space, and by engaging into notches ground in the cast-iron spacer, they prevent rotation of the segments when installed.

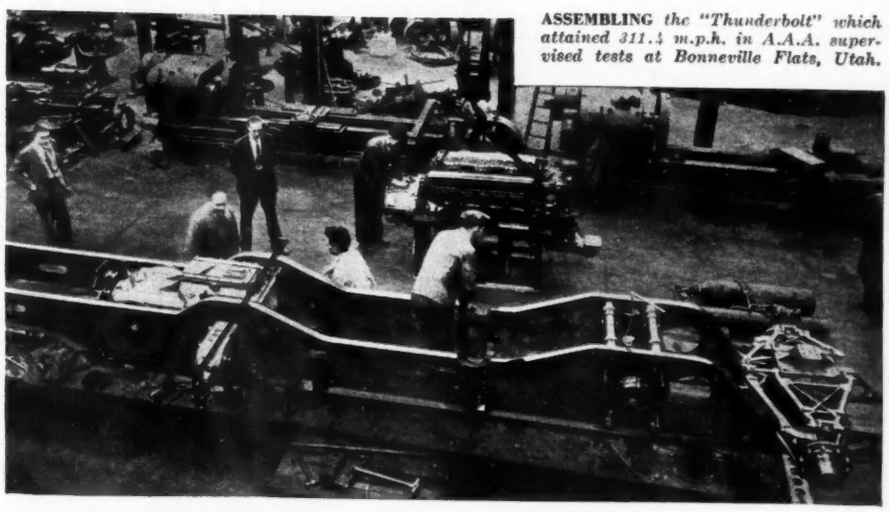
According to the makers, the Burd "Super Hi-Speed" ring is designed to provide free passage for surplus oil together with an adequate oil reservoir for proper lubrication.

3% NICKEL *strengthened the "Thunderbolt's" chassis to withstand shocks and stresses produced by speeds of more than 5 miles a minute.*

"THUNDERBOLT" a mighty prophet of things to come

Pioneer engineers faced ridicule when they dared to build autos to run "a mile a minute". But those early day test cars were a forecast of improved design. Test runs lead the way toward what we can expect from cars of tomorrow. Every car and truck is stronger and safer now because of specialized knowledge of metals and materials painfully learned through dangerous tests—such as the 311.4 m.p.h. record recently achieved by Capt. G. E. T. Eyston. Consultation on your problems involving the use of alloys containing Nickel is invited.

NICKEL ALLOY STEELS



ASSEMBLING *the "Thunderbolt" which attained 311.4 m.p.h. in A.A.A. supervised tests at Bonneville Flats, Utah.*

Let's Look at the Record of Nickel Steels Used:

Part	Steel
Engines (Rolls-Royce, Ltd.)	
Crankshaft	3.5% Ni-Cr.
Connecting rods and bolts, reduction gear and pinions, supercharger gears	*4.25% Ni-Cr.
Camshafts, rockers, camshaft driving gear, accessory drive gears	*5.0% Ni.
Oil pump gears, studs, bolts	3.5% Ni.
Exhaust valves	Austenitic Ni-Cr.
Transmission (E. N. V. Engineering Co., Ltd.)	
Gears and final drive shafts	*4.25% Ni-Cr.
Oil pump lay shaft, gear wheel, oil pump gears,	†4.25% Ni-Cr.
Needle bearing races	*5.0% Ni.
All nuts in gearbox	3.0% Ni.
Final drive bevel gears	4.25% Ni-Cr.
Speed selector rods	3.5% Ni.
Chassis Frame (John Thompson, Ltd.)	
Frame side members, cross members	3% Ni.
Bolts and nuts throughout car	1.35% Ni-Cr.
Steering and Suspension (Burman & Sons, Ltd., and Wolseley Motors, Ltd.)	
Rocker shaft and drop arm	3.5% Ni.
Ball peg and bushing	*3.0% Ni.
Steering head	*5.0% Ni.
Stub axle, housings, steering arms, cranks, forks, track rods, drag links, radius arms, supports, etc.	*4.25% Ni-Cr.
Bracing rods, forks, eyes and adjustors,	3.0% Ni-Cr-Mo-V.
Spring bolts, buffer bracket, drag link joints,	3.0% Ni.
Rear front spring seating, clamping bolts and nuts	1.35% Ni-Cr.
Brakes (Lockheed Hydraulic Brake Co., Ltd.)	
Forged steel rings	Ni-Cr-Mo.
Operating levers and plates	3.0% Ni-Cr-Mo-V
Brake details, brake flap supports	3.0% Ni.
Front brake cross members	Ni-Cr.
Air brake lever	2.5% Ni-Cr-Mo.
Air brake fulcrum and main bosses	5.0% Ni.
Transmission brake torsion bars,	3.0% Ni-Cr-Mo-V.

(The English Steel Corporation, Ltd., supplied the crankshaft steel; other forgings were furnished by Thos. Firth-John Brown, Ltd. The Kayser Ellison & Co., Ltd., made the valves).

* Case-hardened steels

† Air-hardened to 220,000 p. s. i. tensile

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.